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The Right Hon. Lord Welby, G.C.B.

Vol. LXXIX.] [Part I.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

JANUARY, 1916.

The Right Hon. Lord Welby, G.C.B.

An Appreciation.

By The Right Hon. Sir Algernon West, G.C.B.

Reginald Welby was born in the year of the Great Reform Bill of 1832 at his father's Rectory of Hareston in Lincolnshire. He went at the age of 13, rather later than usual in those days, to Eton, where he gained distinction in becoming one of the Select for the Newcastle Scholarship, but what was a greater honour in our boyish eyes he was a great footballer, and was in the Oppidan Eleven at the Wall on one of the rare occasions of their victory.

In his last year he became President of "Pop," but seldom took any leading part in the debates. In investigating the accounts, however, he discovered that the famous Society had exceeded its income: even in those early days the position was intolerable to him, and by means of subscriptions from old members he placed the affairs of the Society on a sound financial basis.

This, however, was not the earliest proof he gave of his financial turn of mind, for previously he had as a boy in 1846 kept the most accurate account of his personal expenditure, carefully tabulated in a form to which no member even of the Royal Statistical Society could have taken objection.

It is not improbable that some preconceived conception may have been his, of the honour that awaited him in becoming first a member, and then President, of this distinguished Society.

From Eton he went to Trinity College, Cambridge, and at the end of his time, on taking a B.A. degree, he had thoughts of a career at the Bar; but this was not to be. Amongst his Eton friends was Sir Arthur Hayter, now Lord Haversham, who persuaded his father Sir William, the Patronage Secretary, to obtain for him from Lord Palmerston a nomination to compete for a Clerkship in the Treasury. He came out first of his competitors, and thus entered the Civil Service, in which he worked and lived for over forty years.

In a letter to Mrs. Russell Barrington dated January 12, 1913,[1] he described the Treasury at the commencement of his official career in 1856 as "a sleepy office of eighteenth century type" that was being turned, through the efforts of Mr. James Wilson, the Financial Secretary, into "what was, for that time, an active "office, with greater opportunity for the clerks to learn their work "and fit themselves for responsibility."

He soon became Secretary to many successive Parliamentary and Financial Secretaries and won the esteem and affection of them all.

In 1880 he was appointed Assistant Financial Secretary, and soon after Auditor of the Civil List. In 1885 he succeeded Lord Lingen as Permanent Secretary to the Treasury, an office he held till his retirement in 1894. Few of the public know the importance of that position. In Mr. Winston Churchill's admirable biography of his father he refers to the civil servant as "concealed from the "public eye, among the deeper recesses of Whitehall, seeking no "fame, clad with the special knowledge of life-long study, armed "with the secrets of a dozen Cabinets," a description which he might have written with Welby in his mind. In that office he naturally became the confidential adviser of many Chancellors of the Exchequer, and earned what he most valued in his long life, the appreciation and friendship of Mr. Gladstone.

He retired from the Treasury honoured with the Grand Cross of the Bath and a peerage; becoming subsequently what he valued most among "the glittering prizes of life" a member of the Privy Council.

He did not take a great part in the debates of the House of Lords: on one occasion he moved the address, but, speaking generally, he observed the rule of "Ne sutor ultra crepidam," and spoke only on subjects of which he was a master, such as the incidence of taxation, Rating Act, &c., but on Committees he was most useful and industrious.

Lord Welby was far too wise and shrewd a man to believe that idleness would bring rest, and his craving for work was only satisfied by its attainment. No sooner had he got clear of the official harness which he had borne so ably and so long, than he became an Alderman of the London County Council. What he accomplished there is best told in the words of Sir Laurence Gomme, the able and distinguished Clerk of the Council, who not only had the best opportunity but the best capacity of making use of that opportunity.

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[1] *The Works and Life of Walter Bagehot* (1915), vol. x, p. 284.

"Lord Welby," he says, "came to the London County Council "as to a new world. From the day of his election as Alderman, "when he took his seat in the municipal parliament of London, "there was a consciousness of a new power in the Council. A "dignity which was all his own; an earnestness of purpose which "his life had brought to him; a quiet effective manner of dealing "with opponents in debate who were not always quiet and certainly "not always effective, which came to him from experience in the "conference room, all these and many other qualities revealed "themselves at once. There was no waiting for them. He was in "full sympathy with the liberal ideals for London; he wanted "its tramways, its streets, its parks, its education put into the "best form. But, as he said to Sir John Benn, laying his hand "on Sir John's shoulder with familiar affection, the difference "between you and me is that you want everything at once, while "I want something left for the next generation to do for London.

"Of course Lord Welby was made Chairman of the Finance "Committee, and those who remember him there, trying to teach "his friends caution and successfully resisting all attempts of his "opponents to introduce a wedge between himself and the party "with which he acted so loyally, will pay willing tribute to the "charm of his great success.

"Of course, too, Lord Welby became Chairman of the Council. "If he did not rule the Council with the same vigour as some of "his predecessors, he ruled it into a consciousness of its own "dignity.

"And then, after serving London in this unstinted fashion, he "remained for a short period without office. He was as great in "service to London then as when he was in office. His helping "hand was everywhere—personal or official, and many of us "remember the delight with which he was always welcomed, "especially when he had a story to relate about Gladstone, "Disraeli, Lord Randolph Churchill and others who had been his "Chiefs at the Treasury. The personal advice he was always "ready to give—one never went to him in vain and never came "away from him without being satisfied that his way was the "right way and one's way was wrong."

During the time of his Chairmanship he constantly entertained at dinner members of the Council, amongst the most agreeable of whom were the Labour Members, who used modestly to recount to us their early careers and how they had won the confidence of their fellows. John Burns, W. Crooks, H. Gosling and others were amongst the guests.

Lord Welby's advice was asked for in many quarters, and he became a member of several important Boards in the City, where his experience was most valuable.

He was a member of at least a dozen London clubs including the "Garrick," "Athenæum," the "Beefsteak," "Cosmopolitan," "Grillions," "The Club" and the "Dilettanti Society." "The Club," one of the chief interests of his later life, was founded in 1764 by Sir Joshua Reynolds and Dr. Johnson, and originally consisted of eight members, including Edmund Burke and Oliver Goldsmith. Lord Welby was elected a member of this exclusive coterie of 40 members on May 30, 1899, at the same time as Lord Avebury, and on March 13, 1906, he was elected its treasurer and only officer in succession to Sir M. E. Grant Duff. He took particular pains in connection with the preparation of a privately printed *History of The Club* (recently issued to its members only), which records the long list of eminent men who have belonged to it, including nine Prime Ministers—Liverpool, Canning, Russell, Aberdeen, Gladstone, Salisbury, Rosebery, Balfour and Asquith. In the "Dilettanti Society" he took a particular interest, associating himself in this with Mr. A. Pember, and both their portraits now hang side by side on the walls of the Club, of which Lord Welby was Secretary at the time of his death. At their dinner on December 5 last, Lord Mersey, who occupied the Chair, made a touching allusion to the loss the Society had suffered in the death of their Secretary. He was a great authority on the topography of London; and Lord Rosebery, delivering a brilliant lecture on Whitehall to the Archæological Society, attributed his knowledge of the subject mainly to the research of Lord Welby. Lord Welby's last sphere of public activity was as President of the Royal Statistical Society, of which he had been a Fellow since 1873, the objects of that Society being identical with many phases of his work at the Treasury. In the Sessions of 1887–88 and 1888–89 he served on the Council of the Society, and was elected to the Presidency on June 16, 1914, in succession to Lord George Hamilton, holding that office at the time of his death.

In his Presidential address, delivered on November 17, 1914, he gave a most comprehensive review of the progress of the United

Kingdom from the time of the French Revolution down to the year 1913. Nothing could have afforded a greater testimony to his unfailing industry than this address, which is printed in the *Journal* for January, 1915.

In 1895 he joined the Cobden Club, and in three years was elected Chairman of Committees, no easy position to fill, but having all his life been a staunch Free Trader, anything connected with Cobden inspired him with the strongest enthusiasm.

With Sir Louis Mallet he undertook a work, now well known to all members of this Society, on Cobden's Life.

His presidency at the International Free Trade Congress was of great interest to him, and involved much patient preparation at that time. He was in the Chair at a great dinner of the Club in 1907, and made an exhaustive speech on that occasion. Though not naturally a good speaker, with great care he made all his speeches clear.

He had no sympathy with secretiveness and still less with bureaucratic control, which he was apt to deplore, as he watched anxiously its growth in this country. He believed in private enterprise where possible, in the place of state-controlled institutions, because he thought it better that any failure in trade should fall on individuals rather than on the State. All or most of the great tragedies of the world, he thought, lay in misunderstandings and secrecy. He delighted in a saying of Jowett's: "Almost every-"body is a very good sort of fellow if you only knew him personally."

Mr. Goschen's saying, "that you must not gamble with the food "of the people," appealed to him greatly. All his friends knew of the extraordinary amount of work that he mastered, but none of us ever discovered when he did it. He always was ready to talk into the small hours. At the "Cosmopolitan"—which was essentially a conversational Club—he was always among the last of the members to go home.

He admired the well-known code of economy preached by Mr. Micawber—Income 100*l.*, expenditure 99*l.*, result happiness: Income 100*l.*, expenditure 101*l.*, misery. and he endeavoured to carry this principle into practice in connection with National affairs. Never was there at the Treasury such a resisting force, and he had to fight against men in high places.

The ever-increasing demands of the spending departments were painful to him.

In December of last year he was knocked down by a motor car and though in a few weeks he recovered apparently his old strength, it was not really so, and its effects, I think, made him incapable of resisting an attack of jaundice which attacked him while passing his Autumn holiday at Malwood, Lady Harcourt's beautiful place in the New Forest.

He was *Felix opportunitate mortis,* for the old order was giving place to new, and economy, which through his life he had striven to maintain, had been thrown to the winds, and the Treasury, instead of being a restraining power, had become one of the foremost of the spending departments.

He had worked all his life assiduously, and how can a man die better than in such circumstances? He had won the respect and affection of all those with whom he had been brought in contact, and has passed away to gain the reward of a well-spent life.

HUMAN CAPITAL AND THE COST OF THE WAR.

By HAROLD BOAG, A.I.A.

THE great loss of life which is taking place in the present war has brought into prominence the question, often debated by political economists, of the valuation as a form of capital of the skill and knowledge embodied in the workers of a country. There is a tragic irony in the fact that it is chiefly when we are suffering from the effects of the loss of life that we desire most to determine its value. The phrase "the loss in men and material" has recently become a commonplace: the determination of the economic value of man in analogous terms to that in which we value material is, however, found to be as difficult a problem as ever.

Owing to the operations of the war being upon a scale unprecedented in history, and owing to it being difficult to form even an approximate estimate of its duration, any attempts to calculate the total cost of the war must at the present time be doomed to failure. While this is so, the estimates which have been made may serve a useful purpose, inasmuch as they give rise to discussion as to methods of ascertainment, which may be a help towards greater accuracy, when, at the conclusion of the war, the various elements of cost can be more correctly determined.

With this object in view, viz., the discussion of methods rather than the calculation of numerical values, it is interesting for us to endeavour to answer the following questions: (1) Is it correct to include in any estimate of the cost of a war the diminution of capital due to the loss of human life? and (2) If so, on what basis should such capital value be calculated?

The answer to the first question depends very largely upon the primary consideration as to whether it is right to include in any estimates of wealth the value of the capabilities of the persons who enjoy such wealth.

Before quoting the opinion of economists on this question, it will perhaps tend to give a certain definiteness to our ideas if we consider, by means of a simple illustration, the analogy between material and personal capital.

Let us take as an example of the former the plant and machinery of a manufacturing company, and as an example of the latter an average workman. The erection of the plant and machinery necessitates an expenditure of labour and material. In some cases the period of erection is necessarily lengthy, and as no production is obtained during this period, interest on capital forms part of the total cost of the plant. When erected, there may be an experimental period, during which further expenditure is incurred, and an inadequate return obtained in the form of production. When the plant is in complete working condition, the full production is obtained, against which there has to be set the cost of running, the cost of repairs and renewals, a charge for depreciation, or a sinking fund reserve to provide new machinery on the wearing out or obsolescence of the existing plant. The excess of the value of the production over these charges forms the net yield, which may include both interest on capital and profit.

The case of the average workman has many points in common. During his childhood and up to, say, 15 years of age, expenditure is incurred on his food, clothing and education. Between the ages of, say, 15 and 21 there is an apprenticeship or experimental period, during which the expense continues, but a small return is obtained in the form of wages. From the age of 21 to, say, 60 or 65, the man earns full wages, but, out of such wages, has to provide for his present maintenance, his cost of repairs, together with a provision for old age, by means of his National Insurance and Friendly Society payments. He has also to pay for the maintenance of his children, which is practically a sinking fund charge to provide the workers for the next generation. Any excess of wages over the cost of necessities is the reward of his industry, or the profit on his human capital.

Seeing that the analogy is so close, are we justified in concluding that every human being has a capital value, in the same manner in which a capital value is assigned to a piece of machinery ?

Professor Nicholson, in his *Principles of Political Economy*, has said, "One of the earliest, and also one of the most enduring "forms of capital was living capital—meaning thereby not only "oxen and sheep, but men, women and children. The animal "first tamed by man was man." And Ruskin, in his essay, "Ad Valorem," has said, "There is no wealth but life. Life, "including all its powers of love, of joy and of admiration." While this may be true, it is impossible to give comparative values to love or admiration. We may be able to compensate a widow for the material losses directly consequent upon her husband's death, but the losses of "love, joy and admiration" are beyond the computation of the most skilful mathematician. It is this loss—the loss of men, not merely as producers, but of men as sons, brothers and husbands—that forms the unascertainable, but the most awful, cost of the present war.

But because part of our loss is incalculable that is no reason why we should not endeavour to arrive at as true an estimate as is possible of that portion of the cost which can be expressed in terms of material wealth. In this we are supported by many political economists. Adam Smith included as one of his four forms of fixed capital "the acquired and useful abilities" of the members of a society. "The acquisition of such talents, by the "maintenance of the acquirer during his education, study or "apprenticeship, always costs a real expense, which is a capital "fixed and realised, as it were in his person. Those talents, as "they make a part of his fortune, so do they likewise of the society "to which he belongs." John Stuart Mill, in a footnote to his chapter on "Unproductive Labour," said, "The human being "himself I do not class as wealth. He is the purpose for which "wealth exists. But his acquired capacities, which exist only "as means and have been called into existence by labour, fall "rightly, as it seems to me, within that designation."

If, therefore, for the particular purpose we have in view, we restrict our ideas of wealth from the philosophical definition of Ruskin to the narrower, but more calculable, limits laid down by Mill, we are able to say, in answer to our first question, that there is as much reason for the inclusion in the cost of the war of the loss of human capital sustained by the nation as there is for the loss of material capital. They are both the result of past production which has been consumed, and have, therefore, both cost a real expense, and in each case further production is diminished by their destruction.

There are one or two important points, however, which should be remembered in connection with the valuation of the capital fixed and embodied in human beings :—

(1) The method by which any values of human capital are obtained and exactly what such values represent should be clearly borne in mind when they are used in later calculations. Different methods of arriving at values may be particularly suited to various problems. For example, one method may more correctly ascertain the loss of capital due to emigration, another to war losses, and a third be more suitable for use in connection with the problem of the distribution of wealth.

(2) Care must be taken to see that the same item of cost is not duplicated by being valued, perhaps in a somewhat different guise, under the headings of both material and personal capital.

(3) The interdependence of the values of material and personal capital must also be borne in mind. Just as the large destruction

of any particular form of material capital may affect the value of the remaining kind of that capital, so any large (and particularly any sudden) depletion of the ranks of the labourers may not only cause direct loss through diminished production, but may also reduce the value of the material capital which is "thrown out of "employment" by the lack of labour.

(4) We must, above all, beware of "arguing in a circle," particularly in connection with such subjects as the present, when the steps of the argument are frequently obscured by a mass of complicated figures. It is, for example, bad reasoning to arrive at a value of human capital largely by capitalising actual incomes at some assumed rate of interest, and later to endeavour to show by a comparison of such values with values of material capital employed, that labour should receive a certain proportionate return in the form of wages.

The above considerations may appear somewhat obvious; but, as will be shown later, it is owing to the neglect of some of these precautions that errors have been made by one or two recent writers on the subject.

We now come to our second question. On what basis should the value of human life, from an economic point of view, be calculated?

In studying the answers given to this question by economists, we are at first amazed by the extreme divergence of the results obtained. On closer examination, however, it will be found that the results are in reality often answers to very different questions.

The methods adopted in arriving at these results may be conveniently divided into two groups: those based on past cost and those based on future yield. In this respect the methods of valuing human capital are analogous to those adopted by actuaries in the valuation of life policies. and termed by them the retrospective and prospective methods. By the former, life policies are valued by accumulating at interest the past premiums paid, and subtracting the accumulated value of past claims; by the latter, the discounted value of the benefit assured is calculated, less the discounted value of the premiums to be paid. In the case of a life policy, however, when the same rate of interest is used, the two methods produce identical results; but in valuing human capital the results differ considerably, because the gross return in the form of wages calculated on the cost is generally greater than the rates of interest usually assumed in capitalising income.

The "cost," or what we may term the retrospective method of valuing human capital, has a disadvantage owing to the fact that it is impossible to determine how much of the cost of education, maintenance, etc., is strictly necessary to produce an income-earner, as distinct from those capacities for "love, joy and "admiration," which may not be incidental to the production of material wealth.

On the other hand, by the "yield," or prospective method, the capital has a different value to (*a*) the man himself (*b*) his family, and (*c*) his employer, according as we capitalise (*a*) his gross income (*b*) his gross income less his personal cost of maintenance (*c*) the gain on his labour to his employer, on the assumption that such labour cannot be replaced. Again, the value of the man to the nation may be taken as: (*a*) the value of his gross income; or (*b*) the value of his net income; or as the sum of the values (*a*) and (*c*), *i.e.*, the capitalised value of his full earning power both to himself and his employer; or (*b*) and (*c*), the value of such earning power, less his cost of maintenance.

Bearing these points in mind, it is interesting for us to briefly review some of the methods which have been suggested for the valuation of human capital.

Towards the end of the seventeenth century, Sir William Petty wrote his essays on "Political Arithmetic," and in one of his many interesting digressions set down "the way of computing the value "of every head one with another of the people of England." He estimated the "expense per head" of the population to be 7*l.*, or 42,000,000*l.* in all, and subtracting therefrom 8,000,000*l.* as the yearly rent of lands and 8,000,000*l.* as the yearly profit of all personal estate, he assumed the balance of 26,000,000*l.* to be derived from the labour of the people. He then assumed that the mass of mankind was, similarly to land, worth twenty years' purchase, and thus arrived at a total of 520,000,000*l.* as the capitalised value of the whole people, or an average value, taking men, women and children together, of, say, 80*l.* per head, "from whence," he said, "we may learn to compute the loss we have sustained by the plague, "by the slaughter of men in war, and by the sending of them "abroad into the services of foreign princes."

In Sir Robert Giffen's paper on "The Cost of the Franco-"German War of 1870–71" a rough method of estimating the value of the loss of human life and of the loss due to the invaliding of the sick and wounded is given. Sir Robert Giffen followed Petty in adopting the yield method, but instead of capitalising at twenty years' purchase, he took the present value of an annuity at age 25 as being worth, say, 15*l.*, and multiplying this by an average annual earning power of 40*l.*, arrived at a value of 600*l.*

per person, which he then multiplied by the number of casualties, having first adjusted such number to allow for those whose value was impaired but was not entirely destroyed. He emphasised very strongly, however, the fact that the calculation was only given as an imperfect estimate in order to convey to the mind some idea of the nature of the loss sustained, and he did not include the figure obtained in his final cost, stating that it was a loss "on "which no pecuniary value could properly be placed."

One of Giffen's qualifications is very important as bearing upon certain recent estimates. After giving his calculation for the value of the loss of human capital, he said, "It should be "remembered, besides, that part of the losses on this account— "so far at least as they affect the surviving community must "have been reckoned under the previous head" (*i.e.*, the losses of material capital). "In any general sum of the expenses of the "war, it would be improper to include both items to the full "amount if they could be exactly ascertained." Although Giffen in writing had in view the licence tax, his remark has a general application and is important whenever we are including losses both of personal and material capital. For example, in Mr. Edgar Crammond's paper on "The Cost of the War," read before the Royal Statistical Society in March last, an estimate of the cost of pensions to widows of soldiers payable during the currency of the war is included, in addition to a capital value for the human life destroyed. Is this not a duplication of cost, to which Sir Robert Giffen's warning would apply? If the total cost to the nation of the loss of human capital is charged first, then a pension to the widow, presumably for the loss of future income of her husband, is merely a redistribution (by way of taxation) of the national income, the widow's total monetary loss (for which she is receiving partial compensation) having been included as part of the national loss under the head of human capital.

Dr. Farr's writings on "The Economic Value of Man" are particularly interesting. In a paper given before the Statistical Society (Vol. xvi, pp. 38–44) on the equitable taxation of property, he said: "The characteristic of life property in wages . . . is "that it is inherent in man, and is the value of his services—of "the direct product of his skill and industry. In slaves it is "vendible and transferable; in freemen it is unalienable; but "it is not the less on that account property. . . . The present "value of the person's probable future earnings, minus the necessary "outgo in realising those earnings, is the present value of that "person's services." In order to determine such value, Dr. Farr applied the science of life contingencies to the problem. After fixing certain amounts of income as receivable and certain outgo as necessary during each year of age, and assuming rates of mortality and interest, he arrived at a value at birth and at every subsequent age of (1) the future wages and (2) the future cost of maintenance, and by taking the difference between these values he obtained the present value at each age of the future profit. The examples given to illustrate the above method were based upon statistics collected as to the wages of agricultural labourers, but some years later Dr. Farr, in the 39th Annual Report of the Registrar-General, applied the method to the whole population. "The capitalisation of personal incomes," he stated, "always "proceeds upon the determination of the present value at any "age of the future annual earnings at that and all future ages— "hence the value of future wages rises from the date of birth, "when it is a notable quantity: is highest in the labouring class "at the age of 25, and declines as age advances, until in extreme "old age, when no wages are earned, it disappears. . . . Taking "a series of observations on the wages of agricultural labourers "some years ago at different ages; determining their value by "a life table at 5 per cent. rate of interest for each age; and "multiplying the numbers living by these values, it is found that "the mean gross value at all ages is 349*l*. But the mean value "of the subsistence of the labourer as child and man, determined "by the same method, is 199*l*.; and, deducting this sum from "349*l*., there remains 150*l*. as the mean net value of the male "population estimated by this standard of the agricultural "labourer. To extend this value to the whole population "(including females), the standard might be lowered from 150*l*. "to 110*l*. per head." After giving calculations for the capitalisation of other forms of income arising from personal exertions, he arrived at the following conclusion: "The minimum value of the population of the United Kingdom, men, women and children, is 159*l*. "per head, that is, the value inherent in them as a productive, "money-earning race. The incomes chiefly under Schedules D, "B and E raise the mean value from 110*l*. to 150*l*."

Here it is seen that Dr. Farr would have obtained a value of over 300*l*. if he had taken the capitalised value of the gross income, but his figure was reduced to 150*l*. by only capitalising the "profit" resulting from the man's labour. This method of taking the value of the man's wages, less his cost of maintenance, gives a useful figure for some purposes. For example, it arrives at the economic value of the man to his family. If the wage-earner be removed his family is impoverished by the amount of his income, less his own cost of maintenance. But in calculations of national loss, the loss of income is usually compared with the total national income and not with the national savings, and, therefore, it is often better to arrive at a capitalised value of the diminution of gross income instead of the " surplus " income.

Professor Marshall, in his *Principles of Economics*, after discussing the two methods of discounting future production and of accumulating past consumption, has said : " Many writers assume, " implicitly at least, that the net production of an average individual " and the consumption during the whole of his life are equal, or " in other words, that he would neither add to nor take from the " material well-being of a country in which he stayed all his life. " On this assumption, the above two plans of estimating his value " would be convertible ; and then, of course, we should make " our calculations by the latter and easier method. We may, " for instance, guess that the total amount spent on bringing up " an average child of the lower half of the labouring classes, say, " two-fifths of the population, is 100*l.* ; for the next fifth, we may " put the sum at 175*l.* ; for the next fifth, 300*l.* ; for the next " tenth at 500*l.* ; and the remaining tenth at 1,200*l.*, or an average " of 300*l.* But, of course, some of the population are very young " and have had little spent on them ; others have nearly got to " their life's end : and, therefore, on these assumptions the average " value of an individual is perhaps 200*l.*"

Professor J. S. Nicholson, in an article contributed to the *Economic Journal* in 1891, endeavoured to form an estimate of " The Living Capital of the United Kingdom " by proceeding somewhat on the lines adopted by Sir Robert Giffen in arriving at estimates of the national material capital. Giffen capitalised those portions of the national income which are supposed to be derived from material capital and added estimated amounts for the material capital which produced no income. Similarly, Professor Nicholson capitalised the remaining portion of the national income which he assumed to be derived from living capital. By capitalising the wages of the labouring classes at thirty years' purchase he obtained a figure of 24,000,000,000*l.* To this he added the capitalised value, at thirty years' purchase, of a portion of the income coming under review of the Income Tax, Schedule D, which he took to be derived from labour and not from material capital, together with a calculated amount for the management of the total material capital, or a total of 12,000,000,000*l.* By capitalising the salaries of officials coming under Schedule E, he obtained a sum of 1,000,000,000*l.*, and to these figures he added a further sum of 10,000,000,000*l.* as an estimate of the value of what he termed "domesticated humanity." He thus obtained a grand total of 47,000,000,000*l.*, or an average capital value per head of the population of 1,250*l.*

The value for domesticated humanity was an estimate of the cost of production made on the assumption that every person costs as much to produce as the value of the house he lives in, and Professor Nicholson stated that "this item is obtained by con-"sidering the people as valuable 'things in themselves' and not "merely as wage-earners." Professor Nicholson's method was a combination of the "yield" and "cost" methods. While we may agree that the whole of the cost is required to produce the persons who are valuable as "things in themselves" and not merely as wage-earners, at the same time and for the same expense wage-earners are produced, and, therefore, there appears to be a certain duplication of values when such cost of production is added to the capitalised value of the wages earned by the persons whose cost of production we have estimated.

In December, 1910, and May, 1911, two papers were contributed to the *Revue Economique Internationale* by the French actuary, M. Barriol, on "The Social Value of an Individual." The results of M. Barriol's calculations have been used by M. Yves Guyot in his article on "The Waste of the War" in the *Nineteenth Century* for December, 1914, and by Mr. Crammond in his paper already mentioned. As both of these writers appear to have used the average values arrived at by M. Barriol without apparently any regard to the special circumstances of the cases to which they have been applied, it may be well for us to examine briefly the methods set forth in M. Barriol's papers.

M. Barriol adopted the "yield" method, and defined the "social value" of an individual as that which he will restore to the community from his earnings. He then assumed certain wages scales, and on similar lines to those adopted in formulating pension fund tables based on salary scales, allowing for a rate of mortality and a 3 per cent. rate of interest, arrived at "social "values" for each year of age. In his first paper M. Barriol gave illustrative tables for two classes of the French population.

In his second paper calculations of average social values were made for various countries. The average values for quinquennial age groups were taken, and each value was multiplied by the population corresponding to that group. By summing the values obtained and dividing by the total population, a weighted average social value was obtained applicable to the whole male population, taking one age with another from birth to the extreme limits of old age. M. Barriol then applied a coefficient of increase or reduction (as the case required) to allow for the difference between the standard of wages in France and other countries. Then recognising that the value obtained was too high, as it assumed that the females (approximately half of the population) earned the full wages scale based upon average male earnings, he rectified this by multiplying by a coefficient which made the result represent an average not only for all ages, but also applying to the whole population, male and female. The average value thus obtained for England was 20,700 francs. say 828*l*., which is the figure quoted by M. Yves Guyot and Mr. Crammond.

It is surely incorrect, however, to take a figure which has been reduced to make it specially applicable as an average to the values of children, women and aged persons and apply it to the casualties of male combatants mainly of "military age," particularly when the original unadjusted values are obtainable in M. Barriol's tables. The values for ages, say, 20 to 40, were the maximum values of the table, and before such values were reduced to include the female population the capital value for an Englishman of military age was over 1,700*l*.

Mr. Crammond in support of the figure of 828*l*. quotes the compensation given under the Workmen's Compensation Acts and from relief funds for the loss of a breadwinner; but is this a true test to apply? As already stated, in the discussion of Dr. Farr's methods, the economic loss sustained by a family is the loss of the man's income, less his own cost of maintenance, and not the full loss of income.

It is because there are such differences that we find it difficult to give any very definite answer to our second question: On what basis should human capital be valued? Different methods are applicable according to the object we have in view. It depends whether we wish to apply our results to the questions of emigration and depopulation, compensation to dependants, the problems of capital (in its more usual sense) and labour, estimates of human progress, or to the losses caused by devastating wars.

In deciding between the "cost" and "yield" methods, there is little choice on the score of accuracy of data, as actual figures for cost are as difficult to obtain as correct estimates of average future earnings. Combinations of the "cost" and "yield" methods are dangerous, owing to the possibility of duplication of values. Our own preference is in favour of the "yield" method as lending itself to more scientific treatment and because it only attempts to value material benefits, while the "cost" method may include expenditure on the development of the individual apart from the increase in his earning power, which development we have purposely placed outside the scope of our notes.

If the "yield" method be adopted, we have to decide whether we are to capitalise gross or net income, and this is, again, largely a question of the use we wish to make of our results. For the purpose of estimating war losses, the capitalisation of a man's total income is probably preferable, as the future loss of income due to the destruction of human capital is then more comparable with the total national income, which is usually expressed in the form of a sum of the individual gross incomes.

It is also important to notice that the chief factors determining human capital values are age, station in life (as affecting cost of maintenance and rates of remuneration), sex, mortality and interest. It is only when all these factors are considered that the resulting values can be safely applied to a case such as the present war, in which the loss of life is greater among the officers than among the men, of which the losses (at any rate of the combatants) are all of one sex, and in which the ages of the men killed and wounded are not average ages of the whole population, but fall within certain comparatively definite limits.

ON THE BIRTH-RATES IN VARIOUS PARTS OF ENGLAND AND WALES IN 1911, 1912, AND 1913.

By THOMAS A. WELTON.

IN dealing with the statistics of births in England and Wales for the years 1911 to 1913, we find in the first place a considerable degree of stability in the figures :—

	Estimated Population.	Births.	Per 1,000.
1911....	36,163,833	881,138	24·4
1912....	36,539,818	872,737	23·9
1913....	36,919,667	881,890	23·9

In the next place, we find that towns and districts engaged in coal mining show the highest birth-rates, and engineering and metal working places rank next.

Other industries show diversified birth-rates, but the most important industry which shows a very low range of ratios is that of manufacturers of textile fabrics.

Country towns not largely engaged in manufactures, and dependent to a great extent upon local trading,[1] also show a low range of ratios, as do small towns generally, excluding those interested in coal mining, and the rural districts generally, subject to a like exclusion.

The lowest ratios of all, and those which continue to decline, are met with in residential places, where there are many unmarried domestics and dressmakers.

The facts are summarised in Table I.

The towns with less than 5,000 inhabitants in which coal mining is the predominant industry have been rather doubtfully set apart, the Census tables giving little assistance ; and the same may be said of the rural districts where either collieries or suburban areas are believed to be a leading feature. But if these districts were accurately distinguished, the conclusions arrived at would, I believe, be the same.

Together with the stability of ratios of which I have already spoken, there is a great deal of variation as between individual districts ; but treating the districts (urban and rural) in *classes*, we have again a great deal of stability, as shown in Table II.

The birth-rates being more dependent on human action than the death-rates, it is to be anticipated that where populations are not very small (so as to render all fluctuations more or less

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[1] Elsewhere in this Paper called " non-industrial."

TABLE I.

Leading Occupations.	1911.			1912.			1913.		
	Estimated Population.*	Births.	Per 1,000.	Estimated Population.*	Births.	Per 1,000.	Estimated Population.*	Births.	Per 1,000.
Coal mining	4,188,772	130,719	31·2	4,270,587	129,310	30·3	4,353,395	131,497	30·2
Textile manufactures	3,148,960	67,395	21·4	3,171,134	66,652	21·0	3,195,077	67,377	21·1
Engineering and metal working	6,549,647	173,377	26·5	6,624,992	174,238	26·3	6,705,181	178,623	26·6
Commerce and shipping	2,536,094	67,505	26·6	2,565,122	67,227	26·2	2,595,338	68,613	26·4
Metropolis	7,054,676	172,854	24·5	7,119,630	172,752	24·3	7,186,211	172,498	24·0
Other industries	2,629,793	64,087	24·4	2,656,468	63,148	23·8	2,685,842	63,735	23·7
Non-industrial	844,523	17,663	20·9	849,739	17,117	20·1	854,527	17,241	20·2
Residential	2,156,627	40,090	18·6	2,210,038	39,723	18·0	2,244,404	39,537	17·6
Undefined†	1,063,926	21,405	20·1	1,073,259	20,714	19·3	1,085,481	21,012	19·4
Rural‡	5,990,815	126,043	21·0	5,998,849	121,856	20·3	6,014,211	121,757	20·2
Total	36,163,833	881,138	24·4	36,539,818	872,737	23·9	36,919,667	881,890	23·9

* These are official estimates for which I take no responsibility.

† Towns under 5,000 inhabitants, excluding colliery towns.

‡ After deducting colliery and suburban areas, but including Tilbury created since 1911.

Subdivided as follows:—

Leading Occupations.	1911.			1912.			1913.		
	Estimated Population.*	Births.	Per 1,000.	Estimated Population.*	Births.	Per 1,000.	Estimated Population.*	Births.	Per 1,000.
Coal—									
Large towns	798,876	25,705	32·2	814,638	25,340	31·1	830,564	25,492	30·7
5,000 and upwards	1,734,445	55,141	31·8	1,775,478	54,792	30·9	1,814,821	55,878	30·8
Under 5,000	137,456	3,977	28·9	139,079	3,858	27·7	140,958	4,051	28·7
Rural†	1,517,995	45,896	30·2	1,541,392	45,320	29·4	1,567,052	46,076	29·4
Textile—									
Large towns	2,054,495	44,320	21·6	2,069,795	44,209	21·4	2,084,523	44,606	21·4
5,000 and upwards	1,094,465	23,075	21·1	1,101,339	22,443	20·4	1,110,554	22,771	20·5
Engineering—									
Large towns	5,550,045	146,866	26·5	5,612,513	147,540	26·3	5,681,980	151,404	26·6
5,000 and upwards	999,602	26,511	26·5	1,012,479	26,698	26·4	1,023,201	27,219	26·6
Commerce—									
Large towns	2,323,988	62,284	26·8	2,350,627	62,242	26·5	2,378,428	63,435	26·7
5,000 and upwards	212,106	5,221	24·6	214,495	4,985	23·3	216,910	5,178	23·9
Other industries—									
Large towns	1,726,201	42,985	24·9	1,746,135	42,523	24·4	1,768,242	43,188	24·4
5,000 and upwards	903,592	21,102	23·4	910,333	20,625	22·7	917,600	20,547	22·4
Residential—									
Large towns	787,757	14,013	17·8	819,755	14,281	17·4	833,763	14,165	17·0
5,000 and upwards	1,009,740	18,164	18·0	1,022,907	17,763	17·4	1,037,902	17,515	16·9
Rural	359,130	7,913	22·0	367,376	7,679	20·9	372,739	7,857	21·1

* These are official estimates for which I take no responsibility.

† Including four towns created since 1911.

TABLE II.

Leading Industry.	1911 Birth-rates.					1912 Birth-rates.					1913 Birth-rates.				
	26 and up-wards.	23 and under 26.	20 and under 23.	15 and under 20.	Under 15.	26 and up-wards.	23 and under 26.	20 and under 23.	15 and under 20.	Under 15.	26 and up-wards.	23 and under 26.	20 and under 23.	15 and under 20.	Under 15.
Coal mining—															
Large towns	11	1	....	....	....	11	....	1	....	....	11	1	....	....	....
5,000 and upwards	106	7	2	....	....	100	10	4	1	....	105	11	3	....	....
Under 5,000	29	3	5	2	1	20	9	9	2	....	27	3	5	4	1
Rural	49	14	9	1	....	49	12	9	2	1	49	9	11	3	....
Textile—															
Large towns	....	6	5	6	....	....	5	6	6	....	....	4	8	5	....
5,000 and upwards	2	16	28	31	2	1	10	27	37	4	....	16	22	37	4
Engineering and metal working—															
Large towns	18	9	3	....	....	18	6	6	....	....	19	8	2	1	....
5,000 and upwards	39	7	14	8	....	36	8	11	13	....	36	8	12	11	1
Commerce and other industries*—															
Large towns	5	12	5	1	....	6	8	8	1	....	6	9	7	1	....
5,000 and upwards	22	25	29	11	1	17	20	34	17	1	17	23	31	17	1
Non-industrial†—															
5,000 and upwards	2	16	38	24	2	1	10	35	34	2	....	8	36	37	1
Residential—															
Large towns	....	....	1	10	....	....	....	2	7	2	....	....	1	9	1
5,000 and upwards	1	3	9	50	11	....	4	12	41	17	....	1	6	49	18
Rural	1	5	7	4	....	1	1	8	6	1	1	....	10	5	1
Undefined—															
Under 5,000	34	51	93	139	49	17	46	87	169	47	27	42	85	149	66
Rural‡	15	106	265	187	11	22	67	209	274	12	21	66	204	274	17
Total	334	281	513	474	77	299	216	468	610	87	319	209	443	602	111

* The Metropolis is included under this head. † These are ordinary trading towns. ‡ Excluding colliery and suburban areas.

fortuitous), there will be a certain persistency in high or low birth-rates. Let us then examine the record of districts with high or low rates, and see how far they vary from year to year.

As already noticed, the highest birth-rates recorded are those in colliery towns. Disregarding for the moment places with less than 5,000 inhabitants, and a few towns constituted since the date of the Census, we have the following places where the birth-rate has been maintained during the three years 1911–13 at fully 30 per 1,000, numbering sixty in all :—

Colliery Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Large towns—				
Rhondda	162,137	35·7	33·3	33·1
Mountain Ash	44,918	34·5	33·4	32·4
Gelligaer	39,901	36·6	37·5	35·3
Abertillery	38,643	35·5	36·4	35·8
St. Helens	99,460	33·5	32·3	32·2
Barnsley	52,897	30·3	30·2	30·3
Towns, 5,000 and upwards—				
Ashington	27,125	37·5	37·0	37·1
Bedlingtonshire	27,039	33·0	30·4	30·6
Blyth	31,844	32·2	33·0	30·8
Earsdon	10,939	30·4	33·7	32·5
Ryton	14,025	32·8	31·5	31·4
Blaydon	33,857	35·4	33·4	32·8
Felling	25,639	32·8	30·1	30·4
Stanley	25,628	35·0	35·2	32·5
Houghton-le-Spring	10,207	32·1	34·9	33·0
Hetton	16,158	36·9	34·3	37·9
Seaham Harbour	17,097	35·1	36·9	36·2
Brandon and Byshottles	18,169	33·7	32·3	32·7
Spennymoor	18,208	34·1	32·6	33·4
Aspull	8,249	30·6	31·0	30·9
Haydock	9,906	32·6	30·2	32·7
Whitwood	5,671	35·4	40·3	44·3
Castleford	24,457	32·7	34·7	32·0
Normanton	15,674	37·1	31·7	31·3
Featherstone	14,921	39·4	33·2	34·4
Pontefract	16,553	31·3	30·2	31·4
Darton	9,750	30·7	36·1	32·5
Royston	6,678	41·1	37·0	34·4
Cudworth	7,643	41·4	37·8	37·4
Ardsley	7,024	34·3	34·6	34·2
Worsboro'	13,328	34·9	33·8	32·4
Wombwell	18,562	37·5	34·9	36·9
Hoyland Nether	15,159	34·3	31·9	33·2
Bolton-upon-Dearne	9,830	43·6	43·2	40·2
Wath-upon-Dearne	12,616	33·5	32·1	32·3
Mexborough	15,352	34·7	33·4	33·7
Swinton	13,998	33·2	32·4	33·4
Rawmarsh	17,808	31·9	31·5	34·0
Kidsgrove	9,178	33·0	31·6	31·7
Smallthorne	14,178	34·8	33·2	34·0
Cannock	29,691	32·7	30·4	32·7

Colliery Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Towns, 5,000 and upwards—				
Brownhills	17,235	32·3	32·4	36·9
Bolsover	12,261	34·2	32·5	30·9
Mansfield Woodhouse	12,486	37·0	33·5	32·2
Sutton in Ashfield	23,348	32·3	31·3	31·4
Huthwaite	5,508	34·6	31·9	35·2
Nantyglo	15,852	35·2	32·8	30·8
Brynmawr	7,761	32·6	30·9	32·3
Ebbw Vale	32,829	35·0	32·4	31·6
Tredegar	24,824	33·8	33·4	32·4
Abersychan	26,306	31·6	30·6	30·3
Bedwellty	25,556	36·8	33·9	36·0
Abercarn	17,364	31·5	38·0	36·2
Caerphilly	36,919	36·0	33·8	33·2
Risca	15,224	31·3	30·6	33·3
Mynyddislwyn	11,572	41·7	35·2	35·3
Ogmore	28,378	35·4	34·4	36·2
Glyncorrwg	9,224	35·6	33·6	38·2
Maesteg	27,365	36·0	32·6	33·1
Ammanford	6,797	30·1	34·6	31·8

The smaller towns and rural districts provide twenty-four more instances, thus :—

Colliery Towns and Districts.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Urban districts under 5,000—				
Newbiggin	3,975	32·0	35·9	35·0
Altofts	4,848	37·4	30·4	36·3
Dodworth	3,347	31·3	30·1	30·5
Methley	4,340	30·5	30·5	33·4
Thurnscoe	4,485	35·2	31·2	36·6
Warsop	4,722	39·3	42·7	42·1
Short Heath	4,205	30·8	34·5	33·8
Rural districts—				
Auckland	59,975	32·3	32·2	30·2
Chester-le-Street	67,490	34·2	33·8	32·1
Durham	31,701	33·7	32·2	32·5
Easington	64,706	37·0	35·6	36·1
Houghton-le-Spring	27,015	36·9	34·8	33·4
Doncaster	41,049	35·4	32·8	36·7
Hemsworth	44,111	37·2	38·6	37·8
Pontefract	15,949	32·4	36·3	32·2
Rotherham	30,453	33·5	34·2	34·7
Blackwell	41,835	36·3	33·2	32·4
Clowne	19,267	36·1	31·6	30·1
Skegby	7,352	33·1	33·1	33·6
Foleshill	24,435	30·7	34·0	34·4
Llantrisant	18,833	34·2	32·6	36·8
Penybont	23,761	30·0	30·0	30·4
Pontardawe	34,029	33·6	31·2	32·0
Ystradgynlais	11,592	35·6	35·6	32·7

These, with twenty more, and three new urban districts, make 107 urban districts of this character where, in 1913, the birth-rate attained 30 per 1,000. The twenty-three districts referred to are now shown :—

Colliery Towns and Districts.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Urban districts, 5,000 and upwards—				
Crook	12,509	31·4	28·2	30·4
Willington	8,933	31·6	29·4	30·6
Shildon	13,902	28·1	28·8	31·5
Darfield	5,722	29·3	34·0	33·2
Abram	7,034	28·8	28·4	31·0
Ashton-in-Makerfield	22,227	28·1	31·9	31·0
Golborne	6,965	31·9	28·8	33·0
Clay Cross	8,367	29·9	31·8	31·9
Kirkby-in-Ashfield	16,590	33·5	29·7	30·3
Audley	15,038	27·6	29·4	30·2
Maryport	11,303	29·5	25·5	30·3
Longbenton	13,373	....	....	30·2
Bedwas	5,319	....	....	34·2
Cwmamman	5,586	....	....	32·6
Urban districts under 5,000 inhabitants—				
Leadgate	5,070	30·4	29·8	34·5
Garforth	4,161	33·5	24·8	30·5
Eastwood	4,663	27·3	29·1	30·7
Bulkington	1,906	33·6	25·6	38·3
Kidwelly	3,212	27·8	24·6	36·7
Rural districts—				
Stoke-upon-Trent	4,893	31·8	29·5	31·3
Walsall	11,159	27·0	29·1	31·6
Atherstone	19,798	27·8	29·7	30·8
Llanelly	29,124	32·1	29·9	31·9

Passing on to the towns in which engineering and metal working are predominant, we have the following places with high rates well maintained :—

Engineering Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Large towns—				
South Shields	144,103	30·5	31·4	31·2
Stockton	72,511	30·3	31·5	32·4
Middlesbrough	110,378	30·9	31·9	31·1
Sunderland	166,434	30·3	31·9	31·1
Urban districts, 5,000 and upwards—				
Llantarnam	7,482	30·7	32·6	30·1
Aberavon	11,212	32·5	33·8	41·0
Eston*	12,224	33·7	32·3	30·9
South Bank*	16,256	34·0	33·8	32·3
Ormesby*	13,509	34·0	34·7	35·3
Ellesmere Port	11,825	37·9	39·8	41·1
Bilston	26,076	32·5	31·3	34·5
Darlaston	17,517	33·0	32·8	32·9
Tipton	32,047	32·2	34·1	34·2
Oldbury	33,919	30·4	31·9	30·6
Flint	5,675	35·9	34·7	31·9
Hebburn	21,970	34·4	35·2	37·2

* These three places are near Middlesbrough; male inhabitants preponderate in each.

And the remaining ten where, in 1913, the birth-rate attained 30 per 1,000 were as under :—

Engineering Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Large towns—				
Rotherham	64,432	28·7	29·6	30·2
Doncaster	51,091	26·7	26·9	30·6
Walsall	93,477	28·7	29·3	30·0
Hartlepool	84,344	29·7	29·1	30·5
Urban districts, 5,000 and upwards—				
Stocksbridge	7,211	27·6	28·9	30·8
Willenhall	18,923	29·0	31·0	32·1
Coseley	22,981	28·4	26·9	32·3
Quarry Bank	7,508	30·0	29·9	31·3
Rowley Regis	37,558	29·3	30·4	31·4
Dawley	7,744	26·5	25·9	30·6

The other places (not colliery or engineering towns) where, in 1913, the birth-rates were equally high are only twenty-one in number. Those in which the rate was fully 30 per 1,000 in each of the three years were as under :—

Other Places.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Large town—				
Stoke-on-Trent	239,284	31·4	31·6	31·3
Towns, 5,000 and upwards—				
Shoeburyness	5,225	31·2	33·4	32·2
Milford Haven	6,710	38·1	36·8	37·9
Knottingley	6,889	32·2	32·7	34·3
Under 5,000—				
Connah's Quay	4,884	36·7	32·8	31·7
Yiewsley	4,579	41·9	32·3	32·1

And those where the rate was not constantly above 30 per 1,000 were :—

Other Places.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Large towns—				
Widnes and Runcorn	49,810	30·6	29·3	30·3
Towns, 5,000 and upwards—				
Dalton-in-Furness	10,222	26·8	31·5	34·3
Tilbury	6,723	....	26·2	35·7
Towns under 5,000—				
Buglawton	1,435	20·2	25·1	32·1
Alvaston	1,427	34·3	22·6	35·7
Thurmaston	1,846	32·3	26·1	31·4
Roxby-cum-Risby....	375	26·5	37·1	50·7
Leiston	4,623	25·8	24·2	31·6
Oulton Broad	4,386	30·0	27·2	30·6
Kingsbury	836	12·2	21·7	34·7
Queenborough	3,021	24·9	25·4	33·4
Rural districts—				
Coventry	645	22·1	48·6	85·3
Uwchaled (Denbigh)	2,246	21·0	26·3	31·6
Thorney (Isle of Ely)	1,927	24·7	27·7	33·7
Tetbury (part in Wilts)	377	24·1	37·3	31·8

The rural districts above named are entirely insignificant, and so are some of the towns. Alvaston is influenced by Derby, Thurmaston by Leicester, Kingsbury by London, and, in a lesser degree, Yiewsley is also dependent upon the Metropolis. It is not easy to understand why the birth-rates are so high at Milford Haven (a fishing town) and at Shoeburyness (where a military element swells the population), but it is much easier to account for such a state of things at Stoke-on-Trent, Widnes, Knottingley and Dalton-in-Furness.[2] Connah's Quay has ironworks, and serves as a port to Chester. Leiston has engineering works. Queenboro' and Tilbury are too well known to need any description. Oulton Broad seems to be an adjunct of Lowestoft, with an important fishing industry.

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[2] The first three are near to colliery districts and the last is chiefly occupied in iron mining.

Before leaving the subject of high birth-rates, it will be well to note that the Metropolis and the largest towns show ratios considerably below 30 per 1,000, though generally by no means low ones. Some of the most noticeable are subjoined :—

Large Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
London	7,186,211	24·5	24·3	24·0
Manchester	1,230,307	25·4	24·8	25·0
Liverpool	1,133,058	28·9	28·7	28·8
Birmingham	1,024,835	26·3	26·3	27·2
Sheffield	486,050	27·8	27·8	28·3
Leeds	457,295	23·7	23·3	23·2
Newcastle-upon-Tyne	468,649	27·9	27·5	27·8
Bristol	374,238	21·6	21·4	22·3
Bradford	318,757	18·9	19·5	19·6
Nottingham	306,287	24·3	23·7	22·7
Portsmouth	275,615	24·9	24·0	24·3
Hull	287,032	28·5	28·0	27·9

Here the lowest three (excluding Bristol) are concerned with textile goods, and the ports, Liverpool and Hull, stand highest, the engineering cities—Sheffield, Birmingham and Newcastle—ranking nearly as high.

Another remark which should not be omitted is, that six iron mining towns (as well as Dalton-in-Furness, already mentioned) show high birth-rates, viz. :—

Iron Mining Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Loftus	9,438	35·0	30·8	29·6
Skelton	15,662	31·4	30·2	29·6
Egremont	6,435	28·0	31·7	29·5
Cleator Moor	8,344	30·2	31·4	29·2
Arlecdon	5,145	35·5	27·7	28·6
Guisborough	7,400	30·3	28·0	28·5

And a few other places show birth-rates high enough to deserve notice, although they are not colliery or engineering towns. Excluding very small places, they are as under :—

Other Places.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Large towns—				
Grimsby	100,955	28 ·3	27 ·6	26 ·9
Towns, 5,000 and upwards—				
Goole	21,232	30 ·8	30 ·3	29 ·0
Fleetwood	16,784	30 ·4	29 ·6	26 ·4
Cheriton	7,693	30 ·7	27 ·7	24 ·7
Melton Mowbray	9,621	28 ·5	24 ·3	25 ·2
Feltham	5,279	28 ·5	25 ·9	24 ·1
Towns under 5,000—				
Hinderwell	2,624	28 ·7	21 ·1	24 ·0
Norton	4,025	28 ·3	22 ·9	26 ·6
Skelmanthorpe	3,933	27 ·2	28 ·3	28 ·2
Dronfield*	3,975	26 ·3	24 ·2	29 ·2
Middlewich	4,967	28 ·9	24 ·7	26 ·0
Tarporley	2,594	28 ·0	20 ·8	23 ·9
Brumby and Frodingham	3,089	33 ·6	29 ·8	29 ·8
Long Sutton	2,912	25 ·3	21 ·9	29 ·9
Bracebridge	2,408	28 ·8	28 ·5	25 ·3
Beaconsfield	2,736	28 ·0	27 ·3	25 ·6
Hayes†	4,660	30 ·0	23 ·7	26 ·0
Neyland‡	2,326	18 ·2	28 ·7	24 ·1
Rural districts—				
Guisborough	7,871	28 ·2	26 ·6	24 ·1
Riccall	3,319	21 ·6	31 ·8	29 ·8
Sherburn	2,270	23 ·5	21 ·2	29 ·1
Stapleford§	10,518	29 ·2	25 ·8	24 ·7
Kingswinford	21,107	25 ·9	27 ·4	28 ·6
E. and W. Flegg	10,106	29 ·0	23 ·7	25 ·7
Knighton	4,344	23 ·9	28 ·3	23 ·9

* Perhaps a coal mining district; it is near Chesterfield.

† Near Uxbridge.

‡ Decreased employment in Government Dockyard is noted in Census volume.

§ Lace-making industry.

Feltham and Hayes are influenced by their nearness to the Metropolis. Kingswinford is near Birmingham, and Bracebridge near Lincoln. There are ironworks at Brumby, and possibly there may be collieries in some of the other districts. It is singular that Cheriton (with Shorncliffe Camp) should even once show a high birth-rate. The ports Grimsby, Goole and Fleetwood do not differ widely in respect of their birth-rates from Liverpool. The other cases I can hardly explain, but it will be noticed that Tarporley, Hinderwell and others show considerable irregularity in their birth-rates, and the high proportion—attained only once in three years—may have been merely accidental.

We can now turn to the lowest birth-rates, remembering that residential places, textile manufacturing towns, ordinary trading towns and agricultural "rural districts" all average well under 22 per 1,000, the old-fashioned normal rate being about 32 per 1,000.

It will be interesting to exhibit the lowest figures in the residential and suburban class, which ranks lowest of all. And first we shall show six large towns and thirty smaller ones where, in 1913, the rate was under 17:—

Residential Places.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Large towns—				
Blackpool	61,012	16·7	16·2	16·8
Southport	71,092	16·1	14·8	15·2
Hastings	76,171	15·7	15·3	14·6
Eastbourne....	54,691	16·5	16·5	16·0
Bournemouth	83,205	15·5	14·9	15·6
Bath	69,944	15·6	16·9	15·7
Towns, 5,000 and upwards—				
Bridlington....	14,778	20·1	18·5	16·9
Harrogate	34,968	17·9	14·8	16·6
Ilkley	8,121	13·2	12·8	14·3
Windermere	5,168	18·1	18·8	13·9
Morecambe	12,211	16·7	15·4	15·7
St. Anne's-on-Sea	10,556	14·3	10·2	11·5
Lytham	10,009	13·3	14·2	14·0
Buxton	9,986	15·0	14·4	14·6
Matlock	6,929	17·6	17·1	16·9
Malvern	16,528	14·9	13·6	13·1
Clacton	10,333	18·0	17·0	16·9
Tunbridge Wells	36,254	16·2	16·1	15·4
Herne Bay	8,033	16·6	18·4	13·7
Margate	28,248	16·1	16·2	16·0
Broadstairs....	9,519	14·0	11·1	13·4
Worthing	32,159	17·4	15·5	15·7
Ryde	10,504	15·8	13·0	15·4
Sandown	5,682	16·5	16·0	15·8
Ventnor	5,768	11·6	14·5	10·4
Sidmouth	5,950	13·8	12·6	12·3
Exmouth	12,316	16·2	13·4	14·1
Teignmouth	9,354	14·1	15·1	13·4
Torquay	40,004	13·8	14·5	13·4
Ilfracombe	9,026	12·1	14·4	12·3
Weston-super-Mare	24,047	17·3	14·5	13·1
Clevedon	6,162	15·9	13·4	14·3
Cheltenham	48,823	19·2	16·0	16·1
Aberystwith	8,506	17·7	13·9	15·4
Colwyn Bay	13,574	17·5	15·4	13·9
Llandudno	10,754	15·7	17·8	14·3

And next, ten other places, which, although not all of them suburban, are at any rate influenced by larger towns in their vicinity:—

Residential Places.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Hessle*	5,694	18·5	24·2	16·7
Hale†	9,259	17·6	15·9	15·2
Hazel Grove†	10,038	17·3	18·6	16·8
Brentwood	7,400	16·8	15·7	16·2
Loughton	5,601	18·5	19·0	16·4
Bushey	7,556	17·6	18·0	16·4
Great Berkhamsted	7,525	13·9	15·1	15·4
Weybridge	6,515	17·3	13·6	15·8
Reigate	29,103	17·3	17·1	15·8
East Grinstead	7,327	17·8	17·3	16·2

* Near Hull. † Near Manchester.

The "ordinary trading towns" showing birth-rates in 1913 less than 17 per 1,000 are only six in number, viz. :—

Ordinary Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Leighton Buzzard	6,890	22·5	21·9	16·3
Saffron Walden	6,410	14·7	17·3	15·6
Bishop Stortford	9,058	20·0	19·8	16·0
Warminster	5,479	17·5	14·4	15·5
Tiverton	10,163	15·0	17·5	15·3
Bodmin	5,825	13·6	13·0	14·4

The industrial towns where in either of the three years the birth-rate was lower than 17 per 1,000 are now shown, viz. :—

Leading Industry Shown.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Textile manufactures—				
Nelson	41,076	18·3	16·4	17·5
Rishton	7,539	20·7	18·9	15·4
Haslingden	18,761	18·9	18·6	15·8
Turton	12,718	17·2	18·8	15·6
Tottington	6,925	18·1	15·5	17·6
Littleborough	11,824	19·8	20·2	15·6
Marple*	6,696	18·0	14·7	13·7
Haworth	6,269	15·6	19·9	16·6
Baildon	6,101	19·7	16·0	16·4
Queensbury	6,055	14·9	12·3	13·4

* In Cheshire; probably a residential place.

Leading Industry Shown.	Estimated Population. 1913.	Birth-rate.		
		1911.	1912.	1913.
Textile manufactures—				
Todmorden....	25,401	17·2	17·6	16·8
Hebden Bridge	7,085	14·4	14·3	14·5
Sowerby Bridge	11,320	17·6	15·5	18·5
Elland	10,739	17·8	15·7	19·0
Slaithwaite	5,761	17·7	20·1	13·5
Meltham	5,197	20·1	13·5	16·9
Mirfield	11,801	19·1	16·9	20·1
Engineering—				
Halstead	6,310	17·2	16·2	19·5
Chippenham	5,394	20·2	19·8	16·9
Frome	10,864	17·3	16·5	14·7
Other industries—				
Walmer	5,283	19·9	17·9	16·7
Portland	17,445	13·7	13·5	12·7
Stroud	8,675	18·8	15·6	21·3

The first seven belong to the Lancashire district, and the remaining places manufacturing textile goods are in the West Riding of Yorkshire. Portland and Walmer contain large numbers of naval and military men. In Hebden Bridge and Stroud there are many tailors.

Turning now to the towns with less than 5,000 inhabitants where low birth-rates have been recorded, the four named below are assumed to have a right to be included amongst colliery towns, though as to this I am not certain.

Colliery Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Whitley Upper	846	16·8	21·5	18·9
Rishworth	939	18·2	22·4	14·9
Usk	1,500	15·4	20·7	15·3
Westbury-on-Severn	1,799	20·4	17·7	15·0

These places are unimportant, and I do not think it worth while to enumerate the sixty-six others where the birth-rate in 1913 was below 15 per 1,000. It may suffice to mention that the list includes Ambleside, Grasmere, Filey, Grange, Alderley Edge, Bowdon, Mablethorpe, Sheringham, Tenby, and many other tourist resorts and residential places.

It is much better worth while to notice the rural districts of considerable population where the birth-rates are low. Four of these I consider to be semi-suburban, viz. :—

Residential Rural Districts.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Watford	16,540	15·8	14·4	14·9
Epsom	31,474	17·6	17·0	17·9
Godstone*	24,500	20·2	18·1	17·5
Sefton†	5,985	18·8	15·7	17·7

* Includes Warlingham, Oxted, Bletchingley, etc.

† Includes West Derby rural.

The other rural districts with populations exceeding 5,000 where in one or more of the three years the birth-rate fell below 15 per 1,000 are only ten in number, viz. :—

Rural District.	County.	Estimated Population, 1913.	Birth-rate.		
			1911.	1912.	1913.
Brampton	Cumberland	7,790	20·2	17·5	14·0
Keighley	W. York	6,778	15·2	14·0	15·3
Wharfedale*	„	9,559	15·3	15·8	12·1
Hayfield	Derby	5,491	20·7	18·0	12·4
Winslow	Bucks	6,986	17·3	17·2	14·5
Elham	Kent	7,591	18·4	14·5	15·8
Newhaven	E. Sussex	5,135	17·2	14·1	13·8
Chailey	„	12,901	14·9	16·6	15·1
Havant	Hants	6,131	14·4	16·6	15·3
Mere	Wilts	5,164	23·0	17·6	14·9

* In this rural district there is a county asylum for lunatics, which must serve to depress the birth-rate.

Reference to Table II will show that a much smaller proportion of rural districts than of undersized towns showed phenomenally low birth-rates. This, I think, is due to the fact that the rural districts usually have populations exceeding 5,000, not less than 332 out of 671 having estimated populations in 1913 exceeding 10,000 persons. There are consequently fewer instances of violent fluctuations in their birth-rates.

If we arrange the smallest towns and the rural districts under twenty-four county groups (to get rid of or at least reduce the anomalies resulting from inequalities of area), we find that in 1913 the " small town " groups showed average birth-rates ranging from 17·7 to 21·3 in sixteen cases, and the rural districts showed average birth-rates within the like range in twenty cases out of twenty-four.

Out of 93 large towns, 28 showed continuous reductions in their birth-rates during the three years 1911 to 1913, 33 showed their lowest rates in 1912, and 11 showed birth-rates steadily rising, leaving 21 where the rates fluctuated otherwise. It should be borne in mind that the average rate in 1912 was the lowest on record, that in 1913 being the next lowest.

If we examine into the differences of rate, locally, as between 1911 and 1913, disregarding 1912, we find great diversity of progress, thus :—

	Decrease of Rate.			Increase of Rate.		
	1 and under 2.	2 and under 3.	3 and upwards.	1 and under 2.	2 and under 3.	3 and upwards.
Large towns	17	3	2	8	2	1
Colliery towns	23	14	21	8	9	6
Engineering towns	7	6	8	9	6	6
Textile manufacturing towns	12	8	15	9	3	3
Other industrial towns .	18	14	15	9	9	1
Ordinary trading towns . .	12	8	17	4	4	6
Residential towns	19	12	8	8	1	—

The towns here referred to are those with at least 5,000 inhabitants in 1911 according to the Census tables.

Individual cases of extraordinary variation shall now be shown. And, first, as to the greatest reductions of birth-rate :—

Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Rhymney*	12,296	35·1	31·1	27·7
Arlecdon†	5,145	35·5	27·7	28·6
Earby‡	6,490	23·8	23·4	17·1
Royston*	6,678	41·1	37·0	34·4
Evesham	8,637	26·2	24·0	19·6
Devizes§	6,789	23·9	21·3	17·5
Mynyddislwyn*	11,572	41·7	35·2	35·3
Pontypridd*	45,822	35·0	32·5	28·7
Leighton Buzzard . . .	6,890	22·5	21·9	16·3
Cheriton	7,693	30·7	27·7	24·7
Normanton*	15,674	37·1	31·7	31·3
Hexham	8,740	23·8	20·9	18·0
Skelmersdale* .	7,091	33·6	29·0	28·1
Loftus†	9,438	35·0	30·8	29·6
Rishton‡	7,539	20·7	18·9	15·4
Annfield Plain*	17,527	34·6	36·3	29·4
Whitchurch	5,885	24·1	20·2	18·9
Featherstone*	14,921	39·4	33·2	34·4
Wigston Magna‖ .	8,709	23·1	17·7	18·1
Mansfield Woodhouse* ...	12,486	37·0	33·5	32·2
Little Lever*	5,212	26·0	19·8	21·3
East Retford§	13,635	26·5	22·9	22·0
Cockermouth	5,167	24·8	22·0	20·3
Lichfield	8,787	23·7	20·4	19·2

* Colliery town. † Iron mining. ‡ Textile manufactures.
§ Engineering. ‖ Boot-making.

Then the greatest additions to birth-rate were as under :—

Towns.	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Whitwood*	5,671	35·4	40·3	44·3
Aberavon§	11,212	32·5	33·8	41·0
Dalton-in-Furness†	10,222	26·8	31·5	34·3
Heckmondwike‡	8,910	18·4	20·3	24·5
Abercarn*	17,364	31·5	38·0	36·2
Brownhills*	17,235	32·3	32·4	36·9
Lewes	10,905	16·2	16·9	20·6
Kenilworth	6,071	20·0	23·9	24·2
Dawley§	7,744	26·5	25·9	30·6

* Colliery town. † Iron mining. ‡ Textile manufactures. § Engineering.

At Evesham there is a large development of intensive culture. Leighton Buzzard, Hexham, Whitchurch (Salop), Cockermouth, Lichfield, Lewes and Kenilworth are accounted ordinary trading towns ; and Cheriton includes the camp at Shorncliffe.

It will be remarked that there are striking examples of both increase and decrease in birth-rates amongst the coal and iron mining, the engineering and textile manufacturing towns, and that even ordinary trading towns are met with on both sides. But it must be remembered that the opening of new coal pits or the exhaustion of old ones, and similar events affecting other industries, have important local consequences.

Finally, I think it necessary to say that the numbers of towns mentioned in this paper are arrived at by omitting 132 places which have been added to the larger towns[3] as being in effect suburbs or portions of those towns (as shown in my paper read before the Manchester Statistical Society last February), and adding a few urban districts created since the last Census was taken. In my opinion every centre of population, such as Liverpool or Manchester, ought, in such investigations as this, to be treated as a single entity, however many urban districts have been carved out of the area within which the workers reside.

Addendum.—As the figures for thirty-seven out of the ninety-three large towns have been given, it is thought expedient to add the others as below.

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[3] The rural district of Yardley is also treated as part of Birmingham, which city absorbed it in November, 1911.

——	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Colliery towns—				
Wigan	112,982	28·5	29·7	29·6
Leigh	45,086	29·3	27·4	27·9
Wakefield	52,291	23·1	22·2	23·0
Merthyr Tydfil	83,808	30·8	29·2	28·5
Aberdare	52,619	32·9	29·4	29·8
Engineering, etc., towns—				
Warrington	74,065	28·1	28·6	29·1
Barrow-in-Furness	65,252	26·6	26·6	29·0
Crewe	45,652	23·0	22·4	22·1
Chester	45,270	23·7	22·7	23·9
Keighley	43,948	20·8	20·9	19·0
Wolverhampton	100,993	25·1	25·5	26·3
Dudley	51,641	27·7	27·7	28·6
Worcester	48,307	22·1	20·9	20·2
Darlington	58,295	26·9	26·0	26·6
Swansea	119,485	29·0	27·8	27·8
Newport (Mon.)	87,626	27·5	27·2	26·8
Derby	125,462	23·6	23·5	23·3
Lincoln	59,322	25·0	23·6	23·9
Gloucester	50,533	24·6	22·6	23·9
Ipswich	85,031	23·3	22·6	23·2
Swindon	52,128	21·7	23·6	23·5
Textile manufacturing towns–				
Bolton	183,879	23·0	22·8	21·8
Oldham	149,936	23·6	23·2	23·0
Blackburn	133,971	21·4	20·5	21·8
Preston	124,969	23·0	23·1	23·2
Stockport	124,157	22·4	21·7	22·2
Burnley	109,021	23·2	23·1	22·8
Rochdale	93,420	21·0	20·3	20·8
Bury	59,159	20·3	20·8	20·1
Ashton-under-Lyne	65,019	23·6	23·8	24·2
Accrington	68,555	19·2	19·4	20·6
Darwen	40,840	18·7	17·0	18·1
Huddersfield	110,882	19·6	19·0	19·5
Halifax	100,740	18·4	18·2	18·7
Dewsbury	53,855	21·7	22·5	23·5
Boot-making—				
Leicester	230,970	23·0	22·6	22·8
Northampton	90,793	21·4	21·5	20·2
Norwich	123,288	22·4	22·1	22·0
Military, etc.—				
Plymouth	210,875	24·3	22·8	23·6
Chatham	129,598	24·6	23·8	23·7
Seaports—				
Cardiff	202,344	25·6	24·7	25·4
Southampton	143,426	24·8	24·1	21·2
Tynemouth	76,664	25·4	26·5	26·0
Commerce—				
Exeter	60,711	19·8	19·9	18·9
Railway service—				
York	83,329	23·6	22·9	23·7
Carlisle	52,630	24·0	24·0	22·1

	Estimated Population, 1913.	Birth-rate.		
		1911.	1912.	1913.
Cycles, etc.—				
Coventry	115,064	26·9	26·8	26·2
Brewing—				
Burton-on-Trent	47,758	21·7	22·2	21·8
Fishing—				
Yarmouth and Lowestoft	91,723	25·2	24·5	24·8
Straw manufactures—				
Luton	53,230	24·3	23·3	24·6
Biscuit-making—				
Reading	89,339	21·7	21·3	20·9
Residential—				
Brighton	183,370	19·0	18·3	17·6
Oxford	53,937	19·2	19·2	17·7
Cambridge	57,096	19·6	20·3	19·5
Watford	43,697	22·1	21·1	20·3
Southend	79,548	19·9	19·2	18·7

ON THE DEATH-RATES IN VARIOUS PARTS OF ENGLAND AND WALES IN 1913.

By THOMAS A. WELTON.

THE issue of the Registrar-General's Report for 1913 puts us in possession of a third item in the new series of returns as to births, deaths and marriages, and, with the amplified data as to occupations in the new Census volumes, admits of a study in considerable detail of local mortality in connection with local employment.

Whilst I consider it extremely desirable that such an investigation should be made, I am of opinion that it could hardly have been usefully entered upon until we had at least three years' data for the municipal and rural subdivisions, the statistics of which are now shown. The circumstance that the third year differs from the second in being much more near to the normal experience of mortality than was the record year 1912, adds to the inducement to explore the facts afresh by the help of the new light now thrown upon local variations.

I am fully conscious that not only local variations in employment and in density of population affect death-rates, but differences in race and in social habits also influence the figures. And the unequal degrees of wealth and the differences of climate introduce fresh causes of inequality of mortality.

The department of the Registrar-General doubtless finds that the demand for its statistical tables comes chiefly from local administrative bodies, the members of such bodies being naturally anxious to watch the progress both absolute and comparative of the communities for whose management they are responsible. Outside investigators who wish to obtain a general view of the national progress may be much fewer in number, but surely they also deserve to be considered. My present purpose, as a humble member of the latter class, is to justify my belief that such a general view is very desirable.

During the last forty years we have seen a great reduction in the English rates of mortality. The following figures will make this clear :—

—	Death-rate.*	—	Death-rate.*	—	Death-rate.*
1841–50	21·6	1881–85	18·7	1906–10	14·4
1851–60	21·2	1886–90	18·5	1911	14·3
1861–70	21·3	1891–95	18·5	1912	12·9
1871–75	20·9	1896–1900....	17·6	1913 ...	13·3
1876–80	19·8	1901–1905....	16·0		

* As standardised in the official tables.

Under the circumstances I think we may now reasonably proceed to classify our towns and districts under the following categories :—

1. Those in which the death-rates, corrected for inequalities in age distribution, are at least 17 per 1,000 inhabitants.
2. Those in which the death-rates reach 14 and fall short of 17 per 1,000.
3. Those which show death-rates of 11 and under 14 per 1,000.
4. Those which show lower death-rates than those last named.

There is some reason for thinking that the new procedure, which aims at attributing to each place the deaths of its regular inhabitants, even if they occur at a health resort or at an institution outside its limits, has to a great extent accomplished its object. We may therefore proceed with all the more confidence to deal with the figures now presented.

I have shown in a paper read at Manchester last February how I divide the population of England and Wales into 1,013 towns and 61 groups of rural districts (by counties), and I will first deal with these :—

Leading Occupation.	Death-rates in 1913.*			
	17 and upwards.	14 and under 17.	11 and under 14.	Under 11.
Coal mining	28	57	41	1
Engineering and iron	14	34	32	11
Textile manufactures	20	45	27	4
Other industries	8	18	52	26
Defence	—	2	7	5
Ordinary trading towns	—	10	47	25
Residential and semi-suburban....	1	2	37	45†
	71	168	243	117
Small places, occupations not shown	29	55	181	149
Total of 1,013 towns	100	223	424	266

* These are always *per thousand* inhabitants and are standardised (as to age constitution) in conformity with the official tables.

† Including six places ranked as large towns.

I shall deal with the small places separately, meantime if we confine our attention to those of 5,000 inhabitants and upwards (in 1911) we have the following percentages, viz. :—

Leading Industry.	Total Number of Towns.	Per cent. on Total Number where Death-rate in 1913 was			
		17 and upwards.	14 and under 17.	11 and under 14.	Under 11.
Coal mining	127	22	45	32	1
Engineering, iron-working, etc.	91	15	37	35	12
Textile manufactures	96	21	47	28	4
Other industries	104	8	17	50	25
Defence	14	—	14	50	36
Ordinary trading	82	—	12	57	30
Residential and semi-suburban	85	1	2	44	53
County groups of rural districts	61	—	3	26	32
Per cent.	—	—	5	43	52

This table is, I think, sufficient evidence that the heaviest mortality is that amongst coal miners,[1] either because of their occupation or their habits, or through the high death-rate which accompanies the high birth-rate usual in such localities. This indicates a state of things which the best administration cannot do much to remedy.

The figures for the ninety-three largest towns may now be summarised, so as to arrive at a conclusion as to whether mere aggregation of men upon limited areas influences mortality unfavourably.

Leading Industry.	Total Numbers.	Number where the Death-rate in 1913 was			
		17 and upwards.	14 to 17.	11 to 14.	Under 11.
Coal mining	12	5	5	2	—
Engineering, iron-working, etc.	27	5	13	9	—
Textile manufactures	17	7	9	1	—
Other industries	23	5	4	14	—
Defence	3	—	1	2	—
Residential places	11	—	1	4	6
Totals	93	22	33	32	6
Per cent. on total number....	—	24	36	34	7

These figures certainly put the larger towns in an unfavourable light, and induce us to note more particularly the twenty-two places amongst them showing the highest mortality. These are now set out :—[2]

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[1] Comparative mortality of working coal miners is not high, though general mortality in coal mining districts is high.

[2] The figures for the remaining 71 towns are shown later

Town.	Death-rate.		
	1911.	1912.	1913.
Colliery towns—			
Wigan	21·2	18·5	21·1
St. Helens	19·7	16·6	20·5
Leigh	21·2	16·5	19·8
Aberdare	19·4	14·7	17·5
Barnsley	21·6	15·0	17·0
Engineering, etc.—			
Middlesbrough	21·5	19·1	19·4
Stockton-on-Tees	17·7	16·5	18·5
The Hartlepools	17·6	16·1	17·7
Walsall	17·0	15·9	17·7
Warrington	17·2	16·0	17·1
Textile manufactures—			
Burnley	20·0	16·6	18·6
Oldham	19·1	17·8	18·4
Ashton-under-Lyne	19·8	18·1	18·0
Dewsbury	18·6	16·5	17·9
Preston	17·8	17·9	17·8
Blackburn	17·6	15·7	17·2
Bolton	17·8	15·0	17·2
Pottery—			
Stoke-on-Trent	21·2	17·2	20·0
Shipbuilding—			
South Shields	17·7	16·9	18·3
Sunderland	18·4	16·1	17·9
Chemicals—			
Widnes	18·1	17·4	18·1
Navigation, docks—			
Liverpool	19·1	17·6	17·5

As 1912 was a record year for low death-rates,[3] we cannot wonder to see how many of these towns showed diminished death-rates in that year. But for the three years the figures remained relatively and even positively high. In all these places, and in forty-nine smaller places which showed death-rates amounting to 17 and upwards per 1,000 in 1913, there may probably be ample room for improved administration as well as for better habits. The average death-rate in London with its immediate dependencies was in 1913 as low as 13·1 per 1,000, and even in Manchester (with its dependencies) the figure only reached 16·4 per 1,000.

The forty-nine places of smaller magnitude where also the death-rate reached 17 per 1,000 in 1913 are now shown in the following order:—

Towns in the coalfields of Durham and Northumberland.

Towns in North Yorkshire (engineering).

Towns in the West Riding of Yorkshire, all but two of them engaged in coal mining.

Towns in Lancashire, mostly engaged either in coal mining or in textile manufactures.

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[3] Chiefly due to a great reduction in infantile mortality, which was not fully maintained in 1913.

Towns in the Derbyshire coalfield.

Towns in South Staffordshire (engineering) with Kidsgrove, a mining town near the Potteries.

And three other places somewhat remote.

Town and Leading Industry.	Death-rate.		
	1911.	1912.	1913.
Hetton .... (coal mining)	21·6	13·3	18·4
Ashington .... ,,	19·8	13·7	17·2
Morpeth .... ,,	14·1	16·5	17·2
Seaham and Harbour ,,	19·3	15·3	17·1
Brandon and Byshottles ,,	17·7	12·0	17·3
Consett .... (engineering)	18·7	13·9	18·1
Hebburn .... (shipbuilding)	17·3	19·3	17·2
South Bank in Normanby (engineering)	20·2	16·9	18·3
Ormesby .... ,,	25·3	18·6	18·0
Eston .... ,,	18·4	15·4	17·5
Whitwood .... (coal mining)	17·8	13·9	24·2
Royston .... ,,	17·3	13·9	20·0
Wath-upon-Dearne ,,	18·8	14·6	19·5
Bolton-upon-Dearne ,,	20·5	13·9	19·0
Castleford .... ,,	17·9	15·5	18·7
Rawmarsh .... ,,	16·9	15·0	17·2
Stanley .... ,,	18·2	12·3	17·1
Normanton .... ,,	14·5	13·9	17·0
Heckmondwike (textile manuf.)	17·4	19·0	18·0
Haworth .... ,,	17·1	13·2	17·4
Tyldesley .... (coal mining)	19·0	15·9	20·3
Hindley .... ,,	18·7	19·8	19·7
Skelmersdale .... ,,	20·7	15·3	19·0
Ashton-in-Makerfield ,,	16·4	13·8	18·2
Atherton .... ,,	18·0	13·2	17·7
Aspull .... ,,	18·9	17·5	17·2
Abram.... .... ,,	18·9	15·5	17·1
Heywood .... (textile manuf.)	18·5	17·1	19·7
Stalybridge .... ,,	20·2	17·7	19·4
Crompton .... ,,	17·7	17·9	18·7
Hurst .... ,,	20·2	16·7	18·5
Bacup .... ,,	16·1	17·3	18·4
Royton .... ,,	20·1	15·8	18·3
Whitworth .... ,,	18·3	20·9	17·9
Farnworth .... ,,	19·1	14·9	17·7
Leyland .... ,,	14·9	15·0	17·7
Clayton-le-Moors ,,	16·5	16·2	17·5
Rishton .... ,,	11·2	12·4	17·1
Prescot .... (electrical appar.)	15·6	14·5	17·1
Clay Cross .... (coal mining)	18·1	15·7	21·6
Chesterfield .... ,,	18·0	14·1	17·5
Willenhall .... (engineering)	19·2	15·9	20·1
Bilston .... ,,	18·4	17·4	19·6
Darlaston .... ,,	18·6	17·6	19·2
Wednesbury .... ,,	17·4	15·2	17·8
Kidsgrove .... (coal mining)	15·0	14·5	17·1
Flint .... (engineering)	18·7	14·2	19·1
Rhyl .... (residential)	11·6	15·9	17·4
St. Just .... (tin mining)	16·7	15·0	17·2

It will be seen that in 1911 and 1912 these forty-nine places may be classified thus :—

——	1911.	1912.
Death-rate under 14	2	13
,, 14 and under 17	10	24
,, 17 and upwards	37	12

Remembering the exceptional character of the year 1912, we may conclude with some confidence that in all but a small minority of these towns high death-rates are usual. The heavy death-rates in Rhyl in 1912 and 1913 were partly caused by certain diseases, as shown :—

——	Deaths in					
	1911.		1912.		1913.	
	Male.	Female.	Male.	Female.	Male.	Female.
No. 9. Pulmonary tuberculosis	9	3	9	7	5	5
,, 12. Cancer, malignant disease	6	9	4	15	6	10
,, 16. Bronchitis	—	1	6	6	4	3
,, 17. Pneumonia (all forms)	3	3	5	9	4	10
Totals	18	16	24	37	19	28
Other causes	37	38	50	39	61	57

The numbers, it will be seen, are small, and are only mentioned because Rhyl, unlike the other towns, might have been expected to show a favourable death-rate, as do the rest of the residential places. Such an example leads one to distrust death-rates for places much smaller than Rhyl.

Rural districts.

The three county groups of rural districts where the death-rates exceeded 14 per 1,000 in 1913 were :—

——	Birth-rate.	Death-rate.
Durham	30·8	15·1
Carnarvon	20·3	14·3
Merioneth	18·3	14·1

It will be well to distinguish the individual rural districts in which the highest death-rates were reached, and to separate those of them which had small populations. First, the larger ones are shown :—

Rural District.	County.	Estimated Population, Mid 1913.	Death-rate.			Notes.
			1911.	1912.	1913.	
Easington	Durham	64,706	18·6	15·1	17·7	
Rotherham	W. York	30,453	17·4	15·4	17·1	
Sunderland	Durham	30,491	17·5	13·3	16·7	
Hemsworth	W. York	44,111	17·0	13·3	16·1	
Doncaster	,,	41,049	14·8	14·2	16·0	
Durham	Durham	31,701	17·7	13·6	15·9	
Auckland	,,	59,975	16·3	13·2	15·6	
Gwyrfai	Carnarvon	27,848	14·0	15·1	15·3	Slate quarrying.
Redruth	Cornwall	17,911	17·9	13·9	15·1	Tin mining.
Llantrisant	Glamorgan	18,833	12·8	13·4	15·0	
Pontefract	W. York	15,949	16·1	15·6	15·0	
Houghton-le-Spring	Durham	27,015	15·5	13·6	14·9	

Except the two districts in Carnarvon and Cornwall, the whole of the above are colliery districts. Only one showed a death-rate lower than 14 per 1,000 in 1911. Next, the smaller districts are tabulated :—

Rural District.	County.	Estimated Population, Mid 1913.	Death-rate.			Notes.
			1911.	1912.	1913.	
Coventry	Warwick	645	13·0	10·6	22·0	
Geirionydd	Carnarvon	4,386	12·2	15·0	19·3	Slate quarries.
Vaynor	Brecon	5,708	17·7	14·7	18·2	Collieries, ironworks.
Sherburn	E. York....	2,270	9·7	10·9	17·6	
Leigh	Lancashire	10,476	15·6	13·8	17·4	Collieries, cotton manufactures.
Barnard Castle	Durham	11,862	11·8	13·1	16·2	Collieries.
Llansilin	Denbigh	3,188	15·7	12·6	16·2	
Todmorden	W. York	4,509	14·1	13·6	16·1	Textile manufactures.
Chirk	Denbigh	4,572	12·9	13·5	15·9	Collieries, etc.
Barnsley	W. York	4,143	19·8	10·7	15·6	Collieries.
Berkhamsted	Herts	4,707	10·4	12·3	15·5	Near London.
Halifax	W. York	6,146	14·6	13·1	15·4	Chemical works.
Helmsley	N. York	5,149	11·2	11·7	15·0	Town of Helmsley.
Edeirnion	Merioneth	5,132	15·2	15·2	14·9	Town of Corwen.
Limehurst	Lancashire	10,620	16·8	15·6	14·9	Cotton manufactures, coal, iron.

The death-rates in these districts having small populations have, as might be expected, fluctuated much more considerably than those in the larger ones, and probably on a ten years' average the former will show more favourably, especially those where there are leading industries other than coal mining. Figures for such small districts as Coventry and Sherburn are naturally of small value.

Having said so much concerning the death-rates which reached 17 per 1,000 and upwards in 1913, I propose now to set out the rates in the rest of the ninety-three large towns, and then to deal with the places where the death-rate shown is unusually low. The seventy-one towns are as under:—

—	Death-rate.	—	Death-rate.
	Per cent.		Per cent.
Colliery towns—		Railway men—	
Pontypridd	15·9	Carlisle	15·2
Rhondda	15·8	York	12·3
Mountain Ash	15·1	Navigation, docks—	
Wakefield	14·5	Tynemouth	15·0
Merthyr Tydfil	14·4	Hull	14·9
Gelligaer	13·4	Cardiff	14·0
Abertillery	12·2	Grimsby	13·1
Engineering, etc.—		Southampton	12·1
Dudley	16·9	Boot manufactures—	
Sheffield	16·5	Leicester	13·8
Leeds	16·4	Norwich	12·9
Manchester	16·4	Northampton	12·9
Rotherham	16·0	Brewing—	
Wolverhampton	15·9	Burton-on-Trent	13·5
Keighley	15·8	Merchants, clerks—	
Doncaster	15·8	Exeter	13·3
Newcastle-on-Tyne	15·7	London	13·1
Barrow-in-Furness	15·7	Bristol	12·6
Birmingham	15·5	Fishing—	
Chester	15·2	Yarmouth, etc.	12·6
Swansea	15·1	Straw hat, etc.—	
Darlington	13·9	Luton	12·5
Newport (Mon.)	13·7	Defence	
Worcester	13·5	Portsmouth	12·4
Gloucester	13·0	Plymouth	14·0
Derby	12·6	Chatham	11·4
Ipswich	12·6	Cycles, etc.—	
Swindon	12·4	Coventry	12·3
Lincoln	12·2	Biscuits—	
Crewe	12·1	Reading	11·1
Textile manufactures—		Residential—	
Bury	16·5	Blackpool	14·8
Rochdale	16·4	Brighton	12·8
Stockport	16·1	Southport	12·1
Bradford	15·9	Bath	11·2
Halifax	15·9	Oxford	11·1
Darwen	15·9	Hastings	10·9
Accrington	15·8	Cambridge	10·9
Huddersfield	15·5	Eastbourne	10·6
Nottingham	14·0	Southend	10·6
Nelson	13·7	Watford	10·2
		Bournemouth	9·4

It will be apparent, on inspection of the above table, that the six large towns which showed death-rates lower than 11 per 1,000 were all residential places, and therefore of an exceptional character.

There are, however, forty-seven towns, industrial and military, where the death-rate was also lower than 11 per 1,000. Those of them—eighteen in number—which in the preceding two years showed death-rates exceeding 12·5 per 1,000, are now particularised.

Urban Districts.		Death-rate.	
	1911.	1912.	1913.
Horsforth .... (W. York)	12·7	11·9	10·8
Marple.... .... .. (Cheshire)	13·9	12·4	9·5
Brownhills .... (Stafford)	15·0	15·4	10·5
Bromsgrove .... (Worcester)	13·3	12·6	10·3
Holbeach .... .. (Lincoln)	12·6	12·0	10·9
Wisbech .... (Isle of Ely)	16·9	11·3	10·8
Wenlock .... (Salop)	13·2	13·0	10·4
Dawley .... ,,	11·9	15·5	9·6
Chipping Wycombe .... (Bucks)	13·4	10·9	10·1
Waltham Holycross .... (Essex)	14·6	12·1	10·9
Maldon .... ,,	14·2	12·4	9·4
Staines .... (Middlesex)	13·7	9·4	9·6
Tonbridge .... (Kent)	13·2	11·0	9·9
Aldershot .... (Hants)	14·5	10·9	10·5
Cowes .... (Isle of Wight)	11·0	12·7	10·9
Frome .... (Somerset)	14·5	12·2	10·0
St. Ives .... (Cornwall)	15·0	12·5	9·9
Paul .... ,,	13·0	10·2	9·7

The remaining twenty-nine showed low death-rates throughout, thus :—

Urban Districts.		Death-rate.	
	1911.	1912.	1913.
Long Eaton .... (Derby)	9·7	10·2	10·0
Market Harborough .. (Leicester)	12·5	11·2	9·7
North Bromsgrove .. (Worcester)	11·1	7·9	9·2
Barton-on-Humber .... (Lincoln)	12·3	11·8	9·9
Peterborough	12·1	12·4	10·7
March .... (Isle of Ely)	12·0	11·5	10·2
Bedford	12·4	11·1	10·1
Rushden .... (Northampton)	11·1	10·8	10·0
Ely	10·0	11·4	9·9
Ramsey .. (Huntingdon)	10·9	11·4	9·3
Wellingborough (Northampton)	11·6	10·7	9·0
Newmarket .. .... (W. Suffolk)	12·0	10·5	9·7
Sudbury .... ,,	12·0	12·2	9·0
Oakengates .... (Salop)	12·1	10·5	10·6
Bletchley .. .... (Bucks)	9·4	10·4	8·4
Grays Thurrock .... (Essex)	11·9	10·7	10·7
Chelmsford .... .. ,,	10·9	9·6	10·3
Hemel Hempstead .... (Herts)	12·2	10·5	10·3
Rickmansworth .... ,,	9·5	12·1	9·2
Whitstable .. .... (Kent)	10·4	11·1	10·8
Cheriton .. ,,	12·2	9·5	10·3
Milton Regis .... ,,	10·3	11·8	9·6

Urban Districts.		Death-rate.	
	1911.	1912.	1913.
Frimley .... (Surrey)	10·0	9·0	8·4
Farnborough .... (Hants)	10·0	10·7	10·0
Eastleigh* .... ,,	8·9	7·4	6·9
Devizes .... (Wilts)	11·4	10·4	10·2
Portland .... (Dorset)	11·3	9·4	9·4
Yeovil .... (Somerset)	11·8	11·7	10·6
Northam .... (Devon)	11·6	10·3	10·7

* It may be well to remark that railway employés are in general a select class as regards health, hence low death-rates at such places as Eastleigh are to be expected.

It is really remarkable that so many as twenty-nine out of forty-seven towns, of which Bedford is the largest, should maintain even for three years moderate rates of mortality. The eighteen which have witnessed greater fluctuations do not include many striking examples of instability of rate, if we consider their moderate magnitudes.

Let us now consider twenty-five places which I have ranked as ordinary trading towns, where also the death-rate in 1913 was under 11 per 1,000 :—

Urban Districts.		Death-rate.	
	1911.	1912.	1913.
Knutsford .... (Cheshire)	10·4	11·5	10·4
Sleaford .... (Lincoln)	10·6	10·3	8·8
Leighton Buzzard .... (Bedford)	11·0	11·9	8·5
East Dereham .... (Norfolk)	11·2	11·5	10·5
Whitchurch .... (Shropshire)	11·9	14·2	10·5
Leominster .... (Hereford)	12·7	10·5	9·5
Hitchin .... (Herts)	12·5	11·0	10·9
Ware .... ,,	11·6	12·2	10·2
Saffron Walden .... (Essex)	11·8	8·0	9·6
Guildford .... (Surrey)	10·5	10·1	10·8
Hythe .... (Kent)	10·1	10·4	10·0
Farnham .... (Surrey)	12·1	9·8	9·0
Alton ... . (Hants)	10·4	10·4	10·7
Andover .... ,,	12·4	11·5	10·6
Basingstoke .... ,,	10·7	9·6	9·8
Winchester .... ,,	11·5	11·2	9·7
Christchurch .... ,,	10·1	8·6	9·6
Fareham .... ,,	12·3	12·9	7·9
Newport .... (Isle of Wight)	12·4	9·0	10·8
Newbury .... (Berks)	12·2	11·9	10·5
Sherborne .... (Dorset)	12·8	11·0	10·8
Warminster .... (Wilts)	12·3	10·7	10·5
Shepton Mallet .... (Somerset)	11·0	11·0	10·2
Bideford .... (Devon)	12·7	10·9	8·3
Bodmin .... (Cornwall)	14·2	11·9	10·5

In this list only two towns (Whitchurch and Bodmin) showed comparatively heavy death-rates in one or other of the two preceding years. Such fluctuations as are shown (at Christchurch and Newport among other places) are not inconsistent with low decennial averages.

There remain thirty-nine residential places of moderate size, the figures for which are now given, not that I consider them of much value for our guidance, because I am uncertain how far the new practice of transferring deaths to the area of residence (referred to in the Seventy-Fourth Annual Report, page viii) has been successfully carried out. But the statistics of places of summer resort or of special attraction for residents must always command a certain amount of public attention.

Urban Districts.		Death-rate.	
	1911.	1912.	1913.
Formby (Lancashire)	10·8	10·6	7·9
Malvern (Worcester)	12·2	11·9	9·9
Hessle (E. York)	9·6	8·4	10·2
Wheatley (W. York)	10·9	9·2	10·9
Ilkley ,,	8·9	8·7	10·1
St. Anne's-on-Sea (Lancashire)	12·1	10·3	10·5
Matlock (Derby)	11·9	9·8	10·4
Colwyn Bay (Denbigh)	13·4	10·3	10·7
Oystermouth (Glamorgan)	11·8	10·5	10·8
Slough	10·2	10·5	10·0
Feltham (Middlesex)	10·7	11·3	10·8
St. Albans (Herts)	11·7	11·1	10·5
Brentwood (Essex)	10·3	6·5	9·6
Harpenden (Herts)	10·2	9·9	8·8
Bushey ,,	6·9	12·0	8·4
Ruislip (Middlesex)	9·1	10·0	6·7
Folkestone (Kent)	11·3	11·8	10·6
Herne Bay ,,	10·5	11·0	10·6
Margate ,,	12·8	11·6	10·5
Tunbridge Wells ,,	10·2	9·7	10·5
Broadstairs ,,	9·3	8·1	10·4
Southborough ,,	10·8	12·6	10·4
Walton-on-Thames (Surrey)	10·7	8·1	9·8
Sevenoaks (Kent)	12·0	9·2	9·6
Chertsey (Surrey)	10·5	9·3	9·3
Egham ,,	11·8	11·3	9·2
Weybridge ,,	8·8	9·1	9·2
Reigate ,,	10·7	10·0	9·0
Woking ,,	8·8	7·9	9·0
Dorking ,,	11·5	9·6	8·5
Worthing (Sussex)	11·7	9·5	10·4
Littlehampton ,,	10·7	10·3	10·4
Burgess Hill ,,	9·2	7·5	10·3
East Grinstead ,,	11·6	7·8	9·5
Sandown (Isle of Wight)	11·6	8·1	10·2
Ventnor ,,	13·7	12·0	9·4
Poole (Dorset)	13·0	10·7	9·9
Exmouth (Devon)	9·7	10·0	9·2
Sidmouth ,,	9·1	10·2	8·7

As might be expected, these small towns, some of which are semi-suburban, such as Formby, Hessle, Wheatley, Slough, Feltham, Ruislip, Bushey, St. Albans, Weybridge, etc., show low figures, in most years. The actual numbers were, in 1911 and 1912, as below :—

—	1911.	1912.
Under 11 per 1,000	23	29
11 per 1,000 and upwards	16	10

And the highest death-rates were only moderately high.

The rural districts which individually showed death-rates under 9 per 1,000 were, in 1913, seventy-eight in number.[4] But if we consult the reports for the preceding two years we find that the death-rates in these seventy-eight districts may be classified thus :—

—	Number in	
	1911.	1912.
Death-rates under 9	9	19
,, 9 and under 11	38	37
,, 11 ,, 14	30	21
,, 14 ,, 17	1	1
	78	78

In like manner we find that in 1911 forty rural districts showed death-rates under 9 per 1,000, but in the next two years the same districts were classed as under :—

—	1912.	1913.
Under 9	12	9
9 and under 11	16	20
11 ,, 14	11	10
14 ,, 17	1	–
	40	39*

* One rural district was abolished in 1913.

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[4] Disregarding parts of rural districts (extending into two counties) with less than 5,000 inhabitants.

And in 1912 as many as sixty-eight showed death-rates under 9 per 1,000, these districts figuring in 1911 and 1913 as under :—

——	1911.	1913.
Under 9	12	19
9 and under 11	31	30
11 ,, 14	23	19
14 ,, 17	2	—
	68	68

It follows that the rural districts in which the lowest losses by death were recorded mostly showed such death-rates in other years as to prevent us from regarding them as being much more healthy than are the average rural districts. We must, I think, be content to regard all annual death-rates in small rural populations as of little value.

The lowest county averages in 1913 were between 9 and 10 per 1,000, and if we exclude small counties like Rutland and Radnor, the Isle of Wight and the Soke of Peterborough, we find that forty-two out of fifty-seven counties showed average death-rates in rural districts ranging from 9·5 to 11·9 per 1,000, which may really be deemed to represent ordinary rural ratios. Every county which showed a higher figure than 11·9, with two small exceptions (Pembroke and Cardigan), had a considerable industrial element in its rural population.

Places with less than 5,000 *inhabitants in* 1911.

These towns, with five others which were not constituted until after the 1911 Census was taken, number 414, and may be subdivided thus :—

Towns in the counties where coal mining is a prominent industry :—

Administrative Counties.	Death-rates in 1913.			
	17 and upwards.	14 and under 17.	11 and under 14.	Under 11.
Northumberland and Durham	1	1	7	1
West Yorkshire	4	13	28	10
Lancashire and Cheshire	7	9	15	9
Derby, Notts and Leicester	1	2	8	9
Stafford, Worcester and Warwick	—	2	5	1
Glamorgan, Monmouth and Brecon	—	1	6	3
	13	28	69	33

Towns in certain Welsh counties, where as I have elsewhere noticed[5] there is some reason to suppose that a predisposition exists towards certain diseases :—

Administrative Counties.	Death-rates in 1913.			
	17 and upwards.	14 and under 17.	11 and under 14.	Under 11.
Denbigh and Flint	2	2	3	1
Carnarvon and Anglesey	1	4	4	2
Montgomery, Merioneth and Radnor	4	1	3	4
Carmarthen, Pembroke and Cardigan	3	3	4	4
	10	10	14	11

Small Urban Districts.	Death-rates in 1913.			
	17 and upwards.	14 and under 17.	11 and under 14.	Under 11.
In the chief colliery counties	13	28	69	33
In certain Welsh counties	10	10	14	11
Elsewhere in England and Wales	6	17	98	105
Totals	29	55	181	149

The ten Welsh towns with death-rates of 17 and upwards were as under :—

Urban Districts.	Death-rates.			Birth-rate, 1913.	Notes.
	1911.	1912.	1913.		
Holywell	16·3	17·0	22·7	20·6	Mining and metal working, yet residential.
Menai Bridge	17·3	8·7	18·0	11·7	Residential.
Llanrwst	20·8	13·1	19·7	17·3	Trading and residential.
Mallwyd	8·5	5·8	21·6	16·5	Rural, small population.
Dolgelley	18·9	14·6	19·9	21·5	Ordinary trading town, yet residential.
Aberayron	17·9	17·4	17·9	15·6	Residential and fishing.
Presteigne	7·0	9·1	19·2	25·1	Residential.
Llanfyllin	11·7	9·7	18·1	17·1	Ordinary trading town.
Cardigan	14·3	12·6	17·7	19·2	Residential and fishing.
Neyland or New Milford	13·8	13·7	18·3	24·1	Residential.

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[5] See *England's Recent Progress*, pages 660–661. The diseases which I imagine are unusually fatal in Wales are phthisis and diseases of the respiratory and nervous systems.

The results for these small places are irregular. The birth-rates are mostly low, and there seem to be no obvious reasons for the high mortality observed in 1913.

The remaining nineteen small towns where the death-rates reached 17 per 1,000 are next shown :—

Urban Districts.	Death-rates.			Birth-rate, 1913.	Notes.
	1911.	1912.	1913.		
Leadgate	17·7	17·0	18·2	34·5	Near Annfield Plain; a colliery town.
Luddenden Foot	18·6	16·3	17·0	20·1	Near Halifax; small, residential.
Oxenhope	13·2	14·6	17·4	14·7	,, ,, ,,
Holme	22·8	11·5	23·1	20·9	Near Holmfirth; very small, residential.
Hoyland Swaine	13·7	15·2	19·7	24·7	Near Penistone; a very small place.
Lees	21·1	15·8	22·5	25·2	Near Oldham; residential.
Buglawton	16·1	16·8	17·4	32·1	Near Congleton; small, partly residential.
Much Woolton	16·2	15·4	17·4	22·2	A small dependency of Liverpool.
Little Woolton	11·5	16·3	17·9	8·5	,, ,, ,,
Childwall	10·2	20·6	42·5	6·1	,, ,, ,,
Mottram in Longdendale	11·8	14·9	17·7	16·2	Near Manchester; residential.
Baslow	5·7	23·4	17·6	22·9	Near Bakewell; a model village.
Roxby cum Risby	15·5	15·5	18·2	50·7	Near Scunthorpe, Lincoln; industrial, small.
Kingsbury	10·3	7·7	20·4	34·7	Near London; residential.
Pocklington	13·3	10·1	17·1	22·7	In East Yorkshire; trading town.
Kirkham	25·0	14·8	17·4	21·7	In Lancashire; trading town.
Market Rasen	14·1	14·1	21·5	20·7	In Lincolnshire; ,, ,,
Haverhill	13·7	10·4	20·6	21·8	In West Suffolk; ,, ,,
Great Torrington	13·3	14·8	18·3	20·4	In Devonshire; ,, ,,

The high death-rates in some of these towns seem purely accidental. In suburban places, any figure apart from the average of the whole town has only a local meaning. In residential places the movements of visitors disturb the results. The only place amongst the nineteen which appears to be subject to a chronic high death-rate (for good reasons) is Leadgate.

The twenty-eight urban districts in the colliery counties whose death-rates were 14 and under 17 per 1,000 may be subdivided into those with high or full birth-rates (27 and upwards) and those with lower birth-rates :—

Urban Districts.	Death-rates.			Birth-rates, 1913.	Notes.
	1911.	1912.	1913.		
Skelmanthorpe	12·6	14·9	16·5	28·2	Trading town.
Monk Bretton	20·7	14·5	16·2	29·9	Colliery town.
Methley	21·6	12·0	15·8	33·4	,, ,,
Tickhill	11·6	11·5	15·7	27·4	Trading town.
Garforth	13·0	12·9	15·0	30·5	Colliery town.
Rainford	14·0	13·1	15·8	28·3	,, ,,
Blackrod	15·1	14·7	15·3	28·5	Cotton spinning and colliery town.
Handforth	22·5	11·7	16·0	27·7	Calico printing and mining.
Warsop	14·3	11·9	15·9	42·1	Colliery town.
Eastwood	13·0	17·4	14·5	30·7	,, ,,
Bulkington	10·5	13·0	15·0	38·3	,, ,,
Short Heath	12·1	13·3	14·3	33·8	,, ,,
Bedwas*	—	10·1	14·2	34·2	,, ,,
Stanhope (Durham).	16·1	13·8	14·7	20·3	Trading town.
Mytholmroyd	14·4	16·0	16·2	14·0	Cotton manufacture.
Drighlington	17·4	16·4	15·7	18·5	Woollen manufacture.
Greetland	15·4	14·7	15·3	15·1	,, ,,
Clayton West....	12·4	12·8	15·2	22·5	,, ,,
Southowram	13·7	17·2	14·6	22·4	Industrial; probably has a colliery.
Denholme	18·4	16·8	14·4	13·7	Industrial.
Penistone	6·4	14·5	14·3	20·6	,,
Thurlstone	13·5	10·2	14·0	18·8	Woollen manufacture; a colliery.
Longridge	16·5	15·1	16·4	20·2	Cotton manufacture.
Little Crosby	4·2	17·7	15·8	18·7	Near Liverpool.
Croston (Lancashire)	11·3	16·5	15·2	18·3	Industrial.
Trawden (Lancashire).	17·4	15·6	14·8	20·1	Trading and manufacturing place.
Alsager (Cheshire).	14·3	9·6	15·2	20·2	Residential.
Compstall	6·6	15·5	14·3	21·8	Cotton manufacture and colliery.

* The urban district of Bedwas was created in 1912.

The great majority of these small towns, with high birth-rates, are colliery towns, whilst the others with lower birth-rates are chiefly engaged in textile manufactures, and some of them show violently fluctuating death-rates.

The twenty-seven urban districts outside the chief colliery counties which in 1913 showed death-rates ranging from 14 to nearly 17 per 1,000 are next particularised :—

Urban Districts.	Death-rates.			Birth-rates, 1913.	Notes.
	1911.	1912.	1913.		
Connah's Quay	14·7	11·2	16·7	31·7	The port of Chester.
Abergele	9·7	16·2	15·3	22·5	Residential.
Llanfairfechan	11·2	12·2	15·9	21·2	Residential: stone quarries.
Amlwch	15·8	11·2	15·3	24·1	Seaport, residential, some miners.
Ynyscynhaiarn	16·7	15·2	15·1	20·5	Portmadoc; exports slates, also residential.
Bethesda	17·0	17·2	14·7	20·5	Slate quarrying.
Knighton	9·0	11·2	14·9	21·9	In Radnor; ordinary trading town.
New Quay	12·0	13·9	15·0	11·9	In Cardigan; residential.
Burry Port	11·7	13·6	14·8	26·2	Harbour, with copper works.
Llandilo	18·2	16·8	14·5	23·8	In Carmarthen; trading and residential.
Harrington	13·8	15·2	14·1	28·7	Harbour in vicinity of mines.
Shap	8·4	12·9	14·0	24·1	Moorland village.
Alford (Lincolnshire).	10·9	9·7	14·8	22·3	Trading town; residential.
Sutton Bridge	6·9	11·0	14·2	18·5	Port; an ordinary town.
Bishops Castle	14·2	14·2	14·2	14·8	In Salop; trading town.
Sawbridgeworth	10·1	6·5	15·6	21·6	Trading town.
Witham	11·3	13·1	14·8	19·5	Old trading town.
Wivenhoe	9·9	11·0	14·7	15·9	Trading and fishing town.
Stow on the Wold.	13·6	7·5	16·6	14·8	Ordinary trading town.
Crewkerne	10·1	11·1	14·6	18·3	Trading town; also residential.
Tetbury	15·3	16·4	14·4	17·6	,, ,, ,,
Ashburton	15·5	14·2	16·7	16·2	,, ,, ,,
Ottery St. Mary	13·9	11·7	15·0	16·8	Residential, with some textile manufactures.
Phillack	13·7	12·8	15·1	25·1	Seaport (Hayle), also mining and residential.*
St. Austell	12·5	11·0	14·2	18·1	China clay workers; also residential.*
Penryn	16·2	11·7	14·2	23·1	Small port, has some industries, residential.*
Ludgvan	15·2	14·9	14·1	23·2	Near Penzance; residential.*

* Several Cornish towns may be deemed partly residential, because the wives of miners working abroad live there, and are supported by remittances from their husbands.

It will be observed that these towns may be classed as follows:—

——	1911.	1912.	1913.
Death-rates under 11 per 1,000	8	3	—
,, 11 and under 14 per 1,000	9	15	—
,, 14 ,, 17 ,,	8	8	27
,, 17 and upwards ,,	2	1	—
Totals	27	27	27

With these facts before me I am unable to value very highly the separate returns for such small places as indices of healthfulness or the reverse. The only safe conclusion which I think can be arrived at is that these twenty-seven towns are seldom subject to mortality exceeding the rate of 17 per 1,000.

In further illustration of the little value attaching to the mortuary statistics of very small places, I may mention that, of the 149 small urban districts referred to on page 50 as showing death-rates under 11 per 1,000, sixty (excluding the newly created urban district of Chorleywood) showed death-rates lower than 9 per 1,000. In preceding years the fortunes of these sixty districts were very varied, as the following table will show :—

——	1911.	1912.
Death-rate less than 9	9	13
,, 9 and under 11	14	19
,, 11 ,, 14	20	19
,, 14 ,, 17	14	7
,, 17 and upwards	3	2
Totals	60	60

There is thus some reason to suppose that the low figures of 1913 represent nothing more than an accidental state of things, and that these places are ordinarily subject to mortality approaching the average.

Conclusion.

The outcome of this endeavour to arrive at a general view of English death-rates in 1913 is to make me restrict future researches very much. It will be of great interest to follow the fortunes of the ninety-three largest towns individually. It will also interest me to classify the 506 places of lesser magnitude under their leading industries and death-rates. But beyond inquiring whether places which had previously shown high rates of mortality are continuing to do so, and whether high rates have been shown in the year under review for places not noticeable in previous years, I should not carry research into individual cases. Very low death-rates seem to be often dependent on mere accident, and should not be regarded save when we are dealing with decennial averages, and even then such averages cannot always be trusted.

With regard to the rural districts, I think in the next Census tabulations we should at the least have the means given us for separating mining populations from agricultural ones. When this can be done I shall follow the details of the county groups of agricultural and of mining districts with interest.

With reference to towns of less than 5,000 inhabitants, I should wish to be enabled to classify them roughly in the same way as I do the larger towns. The results of such a classification might be similar to those of the like classification of larger places, but I think the proportion of ordinary trading towns would be larger, and hence the average would be lower, as foreshadowed by the total figures already given.

OCCUPATIONS OF THE PEOPLE, ENGLAND AND WALES, 1911. MEMORANDUM AS TO MERCHANTS AND CLERKS.

By THOMAS A. WELTON.

I HAVE been led to consider the apparent distribution of merchants and clerks, as it seems to me that we have no better measure of the modern tendency to reside at a distance from the working-place, in some favoured locality. In order to obtain a correct idea of the effect of this tendency, we must first form a conception as to the ordinary proportions of the class, in places not particularly attractive.

In my paper read before the Manchester Statistical Society on February 10, 1915, I distinguished ninety-three towns[1] as being the largest, of which eleven were non-industrial. In the eighty-two business towns the ratios of merchants and clerks per cent. upon the whole numbers of working males were as under :—

8 per cent. and upwards	7 towns.
6·6 per cent. to 7·4 per cent.	14 ,,
5·7 ,, ,, 6·5 ,, ...	12 ,,
4·4 ,, ,, 5·3 ,, ...	22 ,,
3·2 ,, ,, 4·3 ,, ...	14 ,,
1·5 ,, ,, 3·0 ,, ...	13 ,,

The twenty-seven towns ranking lowest include no place which is supposed to attract residents who can choose their place of abode. In the next grade there are a few which may have had some slight attractions at the date when the Census was taken (late in March), and it may be fair to say that 5·3 per cent. represents a sufficient quota for an ordinary business town. The thirty-three towns ranking higher, we may conclude, have more than ordinary trading populations, or possess a residential element. In the case of the Metropolis both these causes are at work to swell the ratio to 11 per cent., the highest of all.[2]

As respects towns of lesser magnitude, but having at least 5,000 inhabitants within the urban area, the facts appear to be as under :—

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[1] Many of these included several urban districts deemed to collectively constitute one town.

[2] Those places which contain larger percentages of merchants and clerks are really dependencies.

—	Above 5·3.	3·8 to 5·3.	Under 3·8.	Supposed Dependent.	Total.
Chief industry—					
Engineering, iron	13	19	29	3	64
Coal, shale mining	—	6	104	5	115
Textile manufactures	1	34	39	5	79
Various other industrial places	7	22	53	10	92
	21	81	225	23	350
Not specially industrial	22	46	7	7	82
Believed to attract residents	21	22	3	28	74
Total	43	68	10	35	156

It may be interesting to note the names of the twenty-one places of industrial character where the ratio exceeds 5·3 per cent.:—

	Per cent.		Per cent.
Rugby	7·1	Chippenham	5·6
Devizes	7·0	Oldbury	5·5
Redditch	6·3	Trowbridge	5·5
Stourbridge	6·0	Yeovil	6·2
Uttoxeter	5·9	Stroud	6·0
Bedford	5·9	Shrewsbury	5·9
Newark	5·7	Kendal	5·6
Loughborough	5·7	Wisbech	5·5
Market Harborough	5·7	Northwich	5·4
Stamford	5·7	Peterborough	5·4
Banbury	5·6		

It is not unlikely that several of these places attract residents, Rugby and Bedford for example. But the towns which are classed as, in this respect only, dependencies of larger places, are more clearly residential. The twenty-three industrial towns of this character are:—

	Per cent.		Per cent.
Gravesend	6·7	Prescot	5·1
Staines	6·7	Tamworth	5·0
Chelmsford	6·0	Horsforth	9·4
Hemel Hempstead	5·8	Pudsey	5·5
Tonbridge	5·6	Bishop Auckland	5·6
Rickmansworth	5·4	Durham	4·6
Cheshunt	4·9	Chesterfield	4·8
Whitstable	4·8	Baildon	7·2
Grays Thurrock	4·5	Stone	5·6
Bredbury and Romiley	9·3	Wolstanton	4·6
Whitefield	8·6	Redcar	9·5
Marple	8·2		

The first nine may draw inhabitants from London, the next three from Manchester, Prescot from Liverpool, Tamworth from Birmingham, Horsforth and Pudsey from Leeds, and the rest from Newcastle, Sheffield, Bradford, the Potteries and Middlesbrough.

And here it should be noted that the eleven non-industrial towns, large enough to rank amongst the first ninety-three, are as under :—

	Per cent.		Per cent.
Southend	18·9	Southport	9·8
Watford	7·3	Blackpool	7·1
Brighton	7·0	Bath	5·9
Bournemouth	7·0	Oxford	5·1
Eastbourne	5·9	Cambridge	5·0
Hastings	5·0		

The first six of these draw many inhabitants from London, the next two from Liverpool and Manchester, and the last three from the whole kingdom.

It will be remembered that thirty-five of the non-industrial places of smaller magnitude have been treated as being dependencies of larger towns. These are :—

	Per cent.		Per cent.
Loughton	13·0	Tunbridge Wells	5·8
Harpenden	11·4	Dorking	5·8
Ruislip Northwood	10·2	Woking	5·6
Bushey	9·6	Herne Bay	5·3
Weybridge	8·9	Feltham	5·2
Brentwood	8·8	Hale	16·8
Walton-on-Thames	8·4	Cheadle and Gatley	14·0
St. Albans	7·6	Hazel Grove	11·2
Uxbridge	7·6	Wilmslow	11·2
Sevenoaks	7·5	Knutsford	6·5
Great Berkhamsted	7·3	Ormskirk	6·4
Hoddesdon	7·2	Formby	13·7
Bishop Stortford	6·7	Hexham	6·7
Reigate	6·4	Clevedon	5·2
Farnham	6·2	Hessle	10·0
Leatherhead	6·1	Bridgend	6·8
Maidenhead	6·0	Wheatley	9·6
Slough	5·9		

The first twenty-three are near enough to London to contain many clerks, etc., who work there ; the next five are near Manchester. Ormskirk may draw workers from more than one place, but Formby looks to Liverpool, Hexham to Newcastle, Clevedon to Bristol, Hessle to Hull, Bridgend to the mining communities of Glamorganshire and Wheatley to Doncaster. None of these places have any claim on their own account to eminence as mercantile centres.

There remain to be noticed forty-three towns of the non-industrial class with high ratios of merchants and clerks which cannot be easily identified as dependent on any adjacent community, but which may still contain a fraction of inhabitants who merely use them as dormitories. And first as to twenty-two such towns which I have not marked as residential, viz. :—

	Per cent.		Per cent.
Salisbury	7·2	Maidstone	5·8
Newtown (Montgomery)	7·2	Bangor	5·8
Haverfordwest	6·9	Penzance	5·7
Hereford	6·8	Kenilworth	5·6
Truro	6·7	Dorchester	5·6
Carnarvon	6·6	Wellington (Salop)	5·6
Wrexham	6·5	Penrith	5·5
Lewes	6·2	Newport (Isle of Wight)	5·5
Taunton	6·2	Carmarthen	5·5
Shepton Mallet	6·1	Ludlow	5·4
Basingstoke	5·9	Oswestry	5·4

I have known two City men who resided at Lewes and Basingstoke respectively, and I imagine there may be such residents in some of the other places, but I have no materials for forming a decided opinion. Possibly in some Welsh and Cornish places the definition of a merchant is hardly the same as in the larger towns.

The places—twenty-one in number—which I think may be called residential, and where the class of merchants and clerks rises above 5·3 per cent., are next shown, as under :—

	Per cent.		Per cent.
Lytham	11·9	Bridlington	5·9
St. Annes-on-the-Sea	11·0	Morecambe	5·9
Ilkley	10·6	Leamington	5·8
Oystermouth	9·5	Aberystwith	5·7
Weston-super-Mare	9·4	Scarborough	5·5
Rhyl	8·8	Stratford-on-Avon	5·5
Buxton	7·8	Ventnor	5·5
Harrogate	7·6	Llandudno	5·5
Colwyn Bay	7·1	Burgess Hill	5·4
Clacton	6·4	Worthing	5·4
Matlock	6·3		

These are mostly seaside and inland pleasure places and health resorts.

The occupations of the inhabitants of towns with less than 5,000 inhabitants were only shown in the Census tables for 1911 in the mass, in "Administrative County" groups. The counties showing the highest proportions of merchants and clerks were :—

	Per cent.		Per cent.
East York	7·9	Hereford	5·2
Cardigan	5·8	Somerset	5·1
Middlesex	5·6	Essex	5·3
Cheshire	5·4	Flint	4·9
Glamorgan	5·4	Denbigh	4·8

The influence of the Metropolis may be traced in the figures for Middlesex and Essex, that of Hull in East York, those of Manchester and Liverpool in Cheshire, and that of Bristol in Somerset. But this would appear much more clearly if we had the data for each town.

The "Rural districts" again are treated of in county groups. The highest averages shown were :—

	Per cent.		Per cent.
Middlesex*	7·4	Cheshire	4·7
Surrey†	7·3	Lancashire§	3·5
Herts	3·7	Worcester‖	5·7
Essex‡	3·2	Glamorgan	3·2

* Including Hendon and Staines.

† Including Croydon and Epsom.

‡ Including Romford.

§ Including Barton-on-Irwell and Limehurst.

‖ Including Halesowen.

In the absence of details we cannot authoritatively state the reasons for these high figures, but we may feel sure that the first four were due to the proximity of London, and the next two to that of Manchester, Liverpool and other large towns. Worcester would be affected by Birmingham, and Glamorgan by the mining towns and Cardiff.

The ordinary proportion in rural districts not much affected by large towns is 1·6 per cent. and under, and in nine cases it is less than 1 per cent.

A word may, perhaps, be said concerning the lowest ratios of this class in towns.

The large towns exhibiting the lowest ratios are these :—

	Per cent.		Per cent.
Mining towns—		Mining towns—	
Abertillery	1·5	Doncaster	2·8
Gelligaer	1·5	Railway towns—	
Mountain Ash	1·5	Crewe	1·9
Rhondda....	1·6	Swindon	2·0
Aberdare....	2·3	Military places—	
Merthyr Tydfil	2·6	Chatham	2·3
Pontypridd	2·8	Portsmouth	2·9

Of the smaller towns (with 5,000 inhabitants and upwards) where the ratio does not exceed 1·5 per cent.—

24 are colliery towns.
1 is engineering (Eastleigh).
1 is textile manufacturing (Barnoldswick).
12 are other industrial places.

None are what I have called non-industrial.

Of still smaller places showing equally low ratios, Bulkington in Warwickshire is a colliery town, Whittlesey in the Isle of Ely is purely agricultural, except for the industry of brickmaking.

It is not difficult to understand that where many men are employed in mines, in railway works or in agriculture, or are gathered in military centres, this class falls to a low point.

NOTES UPON MR. KING'S SHORT METHOD OF CONSTRUCTING ABRIDGED LIFE TABLES.

By C. H. FORSYTH, Ph.D.

IN Part I of the Supplement of the Seventy-fifth Annual Report of the Registrar-General (1914), Mr. King outlines a short method of constructing abridged life tables. Some of the work can be shortened as follows:

Instead of computing graduated quinquennial pivotal values both of the population and of the deaths, these pivotal values may be found of the values of p_x alone and thus shorten the work.

If L_{x+2} refers to the population at the middle of the year represented by the age $x+2$, and $d'_{x+2} = 1/2\ d_{x+2}$ where d_{x+2} refers to the number of deaths at age $x+2$, then

$$p_{x+2} = \frac{L_{x+2} - d'_{x+2}}{L_{x+2} + d'_{x+2}}$$

and if we use W_x to refer to the quinquennial groups of population w_x to one-half of those of the deaths, then from Mr. King's formula

$$u_7 = \cdot 2\, w_5 - \cdot 008\, \Delta^2 w_0$$

$$p_{x+2} = \frac{L_{x+2} - d'_{x+2}}{L_{x+2} + d'_{x+2}} = \frac{\cdot 2\,(W_x - w_x) - \cdot 008\,(\Delta^2 W_{x-5} - \Delta^2 w_{x-5})}{\cdot 2\,(W_x + w_x) - \cdot 008\,(\Delta^2 W_{x-5} + \Delta^2 w_{x-5})}.$$

If we let $D_x = W_x - w_x$ and $S_x = W_x + w_x$

and notice that $\Delta^2 W_{x-5} - \Delta w^2_{x-5} = \Delta^2(W_{x-5} - w_{x-5}) = \Delta^2 D_{x-5}$

and $\Delta^2 W_{x-5} + \Delta^2 w_{x-5} = \Delta^2(W_{x-5} + w_{x-5}) = \Delta^2 S_{x-5}$

$$p_{x+2} = \frac{D_x - \cdot 04\, \Delta^2 D_{x-5}}{S_x - \cdot 04\, \Delta^2 S_{x-5}}. \qquad (1)$$

Hence, to find the graduated quinquennial pivotal values of p_x, we first halve each quinquennial group of deaths, then form columns of D_x and S_x by subtracting and adding respectively these groups to the corresponding groups of the population. The columns of D_x and S_x are then differenced twice and corresponding values of p_{x+2} computed by the formula above.

Also, Mr. King's formula

$$u_7 = \cdot 2\, w_5 - \cdot 008\, \Delta^2 w_0$$

may be generalised, for

if $$y_{\frac{x}{t}} = \sum_{0}^{\frac{x}{t}} u_x \quad \text{or} \quad \Delta y_{\frac{x}{t}} = u_{\frac{x}{t}}$$

then $$u_{\frac{x}{t}} = y_{\frac{x+1}{t}} - y_{\frac{x}{t}}$$

$$= \frac{w_0}{t} + (x-2)\ \frac{\Delta w_0}{t^2} + \frac{x^2 - 9x + 12}{2\,!}\ \frac{\Delta^2 w_0}{t^3} + \frac{x^3 - 21x^2 + 116x - 126}{3\,!}\ \frac{\Delta^3 w_0}{t^4}$$
$$+ \frac{x^4 - 38x^3 + 467x^2 - 2014x + 1915.2}{4\,!}\ \frac{\Delta^4 w_0}{t^5} + \quad . \quad . \quad .$$

where $$w_{\frac{x}{t}} = u_{\frac{x}{t}} + u_{\frac{x+1}{t}} + \quad . \quad . \quad . \quad + u_{\frac{x+t-1}{t}}$$

and $$w_0 = \Delta y_0$$
$$\Delta w_0 = \Delta^2 y_0, \ \&\text{c.}$$

If it is given the usual value of 5, we have

$$u_x = \cdot 2 w_0 + \cdot 04(x-2)\Delta w_0 + \cdot 004(x^2 - 9x + 12)\Delta^2 w_0$$
$$+ \cdot 0008(x^3 - 21x^2 + 116x - 126)\frac{\Delta^3 w_0}{3}$$
$$+ \cdot 00004(x^4 - 38x^3 + 467x^2 - 2014x + 1915.2)\frac{\Delta^4 w_0}{3} + \quad . \quad . \quad . \qquad (2)$$

where the subscript of u has been changed for convenience to unit form.

If x is allowed to take the values 5/5, 6/5, . . . 10/5 in (2) up to and including second differences, and the results differenced, we obtain useful leading term and differences for breaking up into its component values the group w_1 of the three quinquennial groups w_0, w_1 and w_2. The leading term and differences are:

$$\begin{array}{lrrr}
u_5 = & \cdot 2 w_0 & + \cdot 12 \Delta w_0 & - \cdot 032 \Delta^2 w_0 \\
\Delta u_5 = & & \cdot 04 \ \text{,,} & + \cdot 008 \ \text{,,} \\
\Delta^2 u_5 = & & & \cdot 008 \ \text{,,} \\
\Delta^3 u_5 = \Delta^4 u_5 = \Delta^5 u_5 = & & & 0
\end{array}$$

The leading term and differences for breaking up w_0 (or w_2) of w_0, w_1 and w_2 are:

$$\begin{array}{lrrr}
u_0 = & \cdot 2 w_0 & - \cdot 08 \Delta w_0 & + \cdot 048 \Delta^2 w_0 \\
\Delta u_0 = & & \cdot 04 \ \text{,,} & - \cdot 032 \ \text{,,} \\
\Delta^2 u_0 = & & & \cdot 008 \ \text{,,} \\
\Delta^3 u_0 = \Delta^4 u_0 = \Delta^5 u_0 = & & & 0
\end{array}$$

If $x = 7$ in formula (2) where only second differences are used, we obtain Mr. King's particular formula.

NOTE UPON MR. C. H. FORSYTH'S NOTE.

By GEORGE KING, F.I.A.

I AM deeply indebted to the *Editors of the Journal of the Royal Statistical Society* for their permission to add a note to the notes of Dr. Forsyth upon my short method of constructing abridged life tables.

It is all to the good that this question should be discussed from every point of view, and it is well that Dr. Forsyth should suggest other methods of performing the arithmetical work in the construction of abridged life tables. As to the brevity or otherwise of any particular method, that depends very much upon the tools used, because a plan which would suit logarithms, for instance, would not suit the arithmometer. I myself use the arithmometer, together with a table of reciprocals, very extensively, and my modes of procedure have been devised accordingly.

In the first portion of Dr. Forsyth's notes he deals with the ways of applying my formula $u_7 = {\cdot}2\, w_5 - {\cdot}008\Delta^2 w_0$, and suggests one which he thinks is more direct, and more brief. From my point of view, however, I do not think he has improved upon the plan I have followed. Dr. Forsyth's processes are as follows:—

1. He halves the death groups, and writes the results w_x, and he writes the population groups W_x.

2. He forms columns of $\mathrm{D}_x = \mathrm{W}_x - \mathrm{w}_x$, and $\mathrm{S}_x = \mathrm{W}_x + \mathrm{w}_x$. This process is a little irksome because it involves the subtraction or addition of numbers which have a good many places of decimals, and therefore the work cannot be performed by inspection.

3. He forms graduated quinquennial values from the D_x and the S_x columns separately, that is, graduated quinquennial values of $\mathrm{L}_x - \frac{1}{2}d_x$, and $\mathrm{L}_x + \frac{1}{2}d_x$, that is, of l_{x+1} and l_x.

4. He divides l_{x+1} by l_x to form p_x.

My processes are as follows:—

1. I form graduated quinquennial values of L_x and d_x separately.
2. I divide the resulting d_x by the resulting L_x to form m_x.
3. From m_x I form p_x by the formula $p = \dfrac{2 - m_x}{2 + m_x}$.

It will be observed that my third process is very simple, because both the numerator and the denominator can be formed by inspection.

I venture to submit that, at any rate when an arithmometer with a table of reciprocals is employed, there is less work involved in my plan than in that of Dr. Forsyth.

Dr. Forsyth then proceeds to deal with the generalisation of my formula $u_7 = \cdot 2\, w_5 - \cdot 008\, \Delta^2 w_0$, and he produces two formulæ, namely, the one just written above, and another going up to fourth differences. In my report to the Registrar-General on the new National Life Tables I did not give anything beyond what was absolutely necessary for the purposes immediately in view, but in other publications I have given a good deal more in various directions, and, among other things, I have given, in vol. xliii of the *Journal of the Institute of Actuaries*, p. 114, a fourth difference formula as follows: — $u_{12} = \cdot 2 w_{10} - \cdot 008\, \Delta^2 w_5 + \cdot 000896\, \Delta^4 w_0$. This I imagine agrees with Dr. Forsyth's fourth difference formula if we write them out in the same notation. It is worthy of note on this point that in vol. xlvii of the *Journal of the Institute of Actuaries*, p. 284, Mr. S. T. Shovelton, M.A., has a very interesting paper on the graduation of mortality tables by interpolation, in which also he generalises my method, and gives the two formulæ quoted above. They are no doubt the same as those of Dr. Forsyth, but I have not had time to examine into this point. Dr. Forsyth also writes $5u_7 = w_5 - \cdot 04\, \Delta^2 w_0$ instead of

$$u_7 = \cdot 2 w_5 - \cdot 008\, \Delta^2 w_0$$

I may however point out that I also gave that formula in my paper which appeared in the *Proceedings of the Vienna Congress of Actuaries*, Vol 1, p. 1471. When we are constructing a mortality table from the living and the deaths, and when therefore we have to form graduated quinquennial values for both these columns, and divide the deaths by the living, it does not matter much which of the alternative forms is employed, but when we are graduating a table such as one of the values of the rate of mortality, then it is better to use the formula, $u_7 = \cdot 2 w_5 - \cdot 008\, \Delta^2 w_0$.

It should be noted that when the arithmometer is suitably used there are the same number of turns of the handle in each of the forms, so that it makes no difference which form is selected.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*The Wealth and Income of the People of the United States.* By Willford Isbell King, Ph.D., University of Wisconsin. xxiv + 278 pp., 8vo. London: The Macmillan Company, 1915. Price 6*s.* 6*d.* net.

Readers acquainted with Dr. King's admirable work on the Elements of Statistics will anticipate in its practical applications for the present subject great lucidity and interesting presentation, and in that expectation they will certainly not be disappointed. The work has some of the aims and much of the quality of Sir Leo Chiozza Money's *Riches and Poverty*, while in several respects it recalls that author's more recent work *The Nation's Wealth.* But Dr. King has a wider range of statistical resource, and no device for setting out comparative facts is unknown to him. He has recourse to the weapons in his armoury with a nice regard to the powers of the average reader of The Citizen's Library of Economics, Politics and Sociology. The use of the Lorenz curves for displaying comparative distribution of wealth has great advantages over the Pareto line in such a work, although the index of the latter may possess a greater absolute value for the statistician. The diagrammatic presentation is all that can be desired, and one wishes that the data of the comparisons were equally satisfactory. Dr. King has certainly "wrung the last drop" of valid inference from his fragmentary material. He has perhaps sometimes required more from it than it is really capable of giving, but one feels that he is always alive to the actual margin of safety himself. The result is a graphic, impressionistic study, which, within limits, is of great value. One is struck by the singular paucity of really sound material for judging the distribution of wealth in the United States; a recently developed income tax in Wisconsin has to serve for the whole country until the general income tax yields statistics of some utility, and even when these returns are available they will cover only a minority of the incomes because of the high exemption limit. The distribution of property is evidenced only by the death duty statistics of Massachusetts and part of Wisconsin, and it is clear from our own difficulties, after prolonged and unsuccessful efforts to reconcile our estate duty and income tax statistics, that there may be many reasons which would invalidate the rather fine comparisons instituted between the statistics of Prussia, France and the United Kingdom. Nevertheless, the broad fact brought out as to the more unequal distribution in our own country is probably true, though the extent of the divergence is quite uncertain, but the Lorenz curves for the other countries are much too close together for any "precedence" to be established with certainty. All the comparisons are made in tables and diagrams for the seven decades from 1850 to 1910, and if we can forget sources of information and methods of estimating sufficiently to trust the author's work and discretion without reserve, we can enjoy without stint the plentiful supply of inference and conclusion. He has undoubtedly made the most of the material available since Spahr's work of twenty years ago upon the distribution of wealth in the United States. The actual inferences are too numerous for citation here, but among them may be mentioned:—(1) the diminishing returns of agriculture per head of the population: although the average crop per acre is not markedly changing, cattle and sheep are rapidly diminishing in numbers; (2) the rapid exportation of mineral resources leads to the conclusion that the average American of to-day is not as richly endowed with the gifts of Nature as the average American of a century ago; (3) the relative quantity of consumption goods per head is still increasing, but at a diminishing rate; (4) almost three-fifths of the property is possessed by a fiftieth part of the people, while the same proportion of people in the United Kingdom hold a larger fraction, in France less and in Prussia still less. This comparative result is certainly open to some question. Dealing with the general distribution of the National Income among the factors of production, Dr. King has many striking lessons, and he is probably upon surer statistical ground, at any rate for the past three decades, than in his international comparisons. The share of rent has remained relatively constant; the share of wages and salaries has been declining since 1890, and of profits since 1900. Neither Karl Marx nor Henry George would derive much comfort from the work. The most important lesson is that the average real wage is declining: $350 in 1890, $410 in 1900 and $401 in 1910. This result is worked out in detail in various industries. It leads direct to the main thesis of the book, and the author becomes a statistical Malthus: every nation has at a given time, with its resources and particular stage of progress, a maximum average income at which it should aim—population is the controllable variable which may secure this maximum. The States are now suffering severely by the influx of poor class European immigrants, whom he considers should be carefully excluded, and at the same time the European States are in no way relieved, for their populations have a subsistence level for their standard of living, and immediately multiply to the " limit of subsistence." It is strange reading that " the French people have seen the light and placed their numbers on a static basis " at a time when we are measuring national power and security by man power, and if the author lived in Europe at this moment he might qualify his conclusions somewhat by ultimate political considerations. His appeal is to the American citizen to observe that he has passed the apex of increasing returns, and may slacken the decline materially if he will guard his citadel against the alien invader. A clever and courageous book. J.C.S.

2.—*Income: an examination of the returns for services rendered and from property owned in the United States.* By Scott Nearing, Ph.D., Wharton School, University of Pennsylvania. xxvii + 238 pp., 8vo. New York: The Macmillan Company, 1915. Price 5*s.* 6*d.* net.

Dr. Nearing dedicates his work " to three men who grasp the " real significance of the conflict between service and property " income—Joseph E. Cohen, J. A. Hobson, Edwin Cannan." It is not possible to say that the teaching of the two English economists in its essential characteristics has really penetrated Dr. Nearing's thought, for otherwise he could never have left his work in its present unsatisfactory and inconclusive form. He raises far more problems than he settles, and some of his temporary conclusions lead right away from Mr. Hobson's doctrines, despite a certain similarity over a small area. Although the title of the work suggests a book similar in character to that by Dr. King reviewed above, it is really totally different in method and conclusion, and indeed Dr. King's work is a very useful corrective to some of the statements made: " the present economic tendencies will greatly " increase the total amount of property income and the proportion " of property income paid with each passing decade." The author is in the fashion when he opens his subject with general superciliousness about " old-fashioned " economic terminology and the purblinds who adhere to it. He announces his own substituted and up-to-date conception of functional classification—" property " income " and " service income "—almost in the light of a discovery and with somewhat wearisome reiteration as to the distinctions. The classification known to us through the taxing code—" earned " and " unearned " income—is really identical. In essence, and to a much greater degree of elaboration, the discussions by Hubbard, Sargant, Farr and Mill in the 'sixties, embodied all that he gives us. But in the treatment of the alleged " conflict "—the struggle to obtain a larger share of the mutual product of labour and capital

—the work has some of the qualities of Marx and George. A public discussion between Dr. Nearing and Mr. W. H. Mallock would certainly be entertaining. A large part of the book is taken up with statistical investigation of the income accruing to effort and to property respectively. In the absence of comprehensive national statistics the author has collected a large amount of evidence, often very diverse and confusing, from various corporations and trading bodies. It is exceedingly difficult to summarise accurately or to generalise from, but as a general conclusion to the investigation it is found that about nine-tenths of the adult males receive wage rates of 200*l*. per annum or less, and an equal proportion of females receive less than 150*l*. Four-fifths of the men fall below 150*l*., a third below 100*l*. "Hereafter, no one need discourse at length "on the theme of the spendthrift labourer and the ensuing hardship "of his family." The investigation into property income leads to the conclusion that 1,200,000,000*l*. per annum is a maximum sum, and as there are probably 12,000,000 families which together have an average expenditure of 100*l*., this sum would "pay all their "expenses," or, added to their incomes, would raise them to a level of income respectability. Then follows an eloquent indictment of "unearned" income—the return upon property with its exceptional privileges of priority, stability, permanence and concentrability which have been so carefully bestowed upon it by an age careless of any regard for humanity. (The reader will feel like a convict when next he receives a 5*l*. dividend, albeit taxed beyond recognition.) Clearly labour, skill and management have to demand a much larger share of the total produce of industry, but how the new equilibrium is to be maintained is not explained. We are not told how economic rent can be annihilated or reduced; nor is the character of interest discussed. What are the prospects of capital accretions sufficient to provide labour with necessary co-operation, if interest is artificially restricted or if the safeguard of priority and stability are denied to capital? It is not necessary to deny that more capital may *have* to be saved if interest is less, for that result is not very probable. Does Dr. Nearing seriously suggest that depreciation of machinery should *not* be provided for in priority to division of profits? He fails to do justice to the fact that labour actually *does* get remunerated or "kept up" when it is employed, in priority to the upkeep and remuneration of capital, which often gets neither even when fully productive. The parallels between the labourer and "plant" are teleologically unsound and of little value. This book, as statistics, is useful without taking us far along reliable new ground; as economics it is second rate politics wearing an academic gown. J.C.S.

3.—*The Material Culture and Social Institutions of the Simpler Peoples. An Essay in Correlation.* By L. T. Hobhouse, G. C. Wheeler and M. Ginsberg. 299 + vii pp., 8vo. London: Chapman and Hall, Ltd., 1915. Price 2*s*. 6*d*.

This book, one of the series of studies in Economics and Political

Science issued by the London School of Economics, describes the results of a detailed study into the institutions of the "simpler "peoples," and attempts by statistical means to indicate the degree of association between material culture and social institutions, The amount of research involved in producing it must have been very considerable, but the adoption of the statistical method rendered it possible to compress into less than 300 pages information of a most interesting character, which must by other methods have involved a much bulkier volume.

The criterion adopted for classifying tribes according to the stage of economic culture reached was primarily that of the mode of obtaining food, and the categories employed were: (1) Lower Hunters; (2) Higher Hunters; (3) Dependent Hunters; (4) Agriculture I; (5) Pastoral I; (6) Agriculture II; (7) Pastoral II; and (8) Agriculture III. Thus, the "Lower Hunters" are those peoples which live largely on fruit and roots, have no permanent dwellings, nor progress in the arts. The "Higher Hunters" live more by the chase, have some sort of house or tent, and show slight acquaintance with the arts. The distribution of the eight categories is not continuous, as while some tribes follow the pastoral line others follow that of agriculture.

The social institutions examined fall under the heads: (*a*) Government and Justice; (*b*) The Family; (*c*) War and Social Structure. In the case of government, the classification adopted was: (i) Hereditary; (ii) Personal; (iii) Chief has power; (iv) Chief has influence only; (v) Chief has power as war leader, without having general power; (vi) Peace and war chiefs are distinct; (vii) Government by discussion or council; (viii) Government slight or nil. The association between economic culture and government is indicated by drawing up a table, familiar to students of statistics as a "con-"tingency table," in which each of the eight categories representing economic culture is sub-divided into eight classes according to the method of government practised. Similar means are employed in the cases of the other social institutions.

Though the method employed to investigate these problems must receive the full approval of the statistician, the manner in which the method is applied cannot, in view of the development of statistical science in recent years, be said to be sufficient. Percentages are used throughout. Thus the correlation between economic culture and form of government is expressed by showing that while 47 per cent. of the "Lower Hunters" fall into category (viii) above (government slight or nil), 25 per cent. of the "Higher Hunters," 10 per cent. of the "Pastoral I" group, etc., fall into that category. This is certainly a means of indicating association between the existence of a form of government and economic development, but it is insufficient to do justice to the many problems suggested by the collection of such important data. The statistical index known as the coefficient of contingency was devised to deal with problems essentially similar in form to those discussed in this book, and it is a matter for regret that this coefficient was not ascertained for at least a few of the most important tables. E.C.S.

4.—*Insurance.* By T. E. Young, B.A., F.R.A.S. xxii+423 pp., 8vo. London: Sir Isaac Pitman and Sons, 1915. Price 7*s.* 6*d.*

This is the third edition of this work, substantially identical with the previous edition, with the addition of a chapter on the National Insurance Act. It is a work intended for professional students, "designed to afford a clear and succinct exposition, in an elementary "form, of the principles upon which insurance administration is "based and conducted." No advanced knowledge of mathematics on the part of the reader is postulated, but the author contrives to deal with many subtle points and to make clear the principles upon which difficult questions turn. For the layman the chapter on Surrender Values is of special interest, as it is a question on which most people are very foggy. It is interesting to find that even the experts are not yet at the bottom of it. One is surprissd to read that "on the whole, and in the long run, the aggregate of members "who withdraw (by lapse and surrender) possess the normal state "of health, and not improbably a superior vital capacity to that "existent among the assurance community from which they retire." One would perhaps have supposed *a priori* that surrenders would be more numerous among those whose health was failing and who, for that reason, found difficulty in keeping up their payments.

What strikes one most, perhaps, on reading this book at the present time is the contrast between the niceties of calculation in connection with all those points on which statistical data can be obtained, and the large incalculable disturbances which occur with variations in such things as the rate of interest and the capital value of investments, and, of course, the mortality caused by the war. This book might be adduced, if any further evidence were needed, as proof that serious people in England were not expecting war. A reference to the price of Consols on July 29, 1914, suggests that the revision was finished about that date, but one may search the chapters without discovering the slightest allusion to the possibilities of war as anything to be taken into consideration by an insurance company—not even in the chapters on valuation, investments and marine insurance. That is hardly a matter which can be complained of, however, but we may expect a good deal of additional matter in the next edition.

In connection with the valuation of securities the author properly points out the difference between the position of an insurance company and a bank. The former has not to follow so closely temporary fluctuations, as it is unlikely to be under the necessity of realising any large part of its securities at an early date. He seems to accept rather too readily the "eleven-year period" of trade fluctuations, and even to endorse the sun-spot theory of their cause. It may be suggested that more recent experience does not quite support the simple eleven-year period. What seems to be more important, both in regard to values of stocks and the rate of interest obtainable, is the upward or downward tendency of the general level of prices, which experience shows may continue for long periods in one direction, with a very marked effect on both capital values of fixed interest investments and on the interest obtainable on new investments. This is a subject which should merit considerable attention by managers of insurance companies. It is not referred to at all by the author, nor is there any suggestion that in periods of rising prices ordinary shares of business companies, which profit by this condition, might be a proper source of investment—with due regard to the necessity of spreading the risks of course. The author is naturally quite alive to the importance of spreading risks of fluctuations of values of investments, so far as such fluctuations are due to the varying fortunes of particular industries, but he does not offer any caution against the hitherto too prevailing belief that good reliable fixed interest-bearing securities are to be regarded as necessarily superior in stability of value to the more individually variable industrial ordinary shares.

The author remarks on the difficulty introduced into the distribution of profits by the present preponderant increase of endowment policies, and voices the professional regret at this persistent change of public demand. It is to be feared, however, that there is not much likelihood of any general reversion to ordinary plain life insurance policy. The advantage of this mode of investment for men of moderate means is too great, in view of the exemption from income tax, to be set aside. Apart from this, however, is not the real truth that the ordinary life insurance policy does not give people what they want ? Leaving out of account the desire to accumulate a fund for old age—which is, and should be treated as a totally distinct thing from insurance against premature death—the ordinary professional man who has married and is dependent on his earning capacity for the maintenance of his income, wants to insure more especially against the chance of premature death, before his family are self-supporting. The old-fashioned life insurance does not concentrate sufficiently on this. It obliges a man to pay not only against the risk of death during middle age, but also to pay for accumulating a fund which his family will receive if he lives to old age—as he usually expects to do. Would not married men be readily induced to take up cheap policies simply against the risk of death within a certain number of years—nothing to be paid if they survive ? People insure their houses against fire readily enough, although they do not expect to get any return. They do not have to be induced to insure against fire by the promise of a definite sum to be received after a certain number of years in the event of no fire occurring. Such life insurance policies are obtainable, no doubt, but they are not thrust upon people's attention as they should be, nor does one feel confident that they are offered upon terms really suited to the degree of risk involved. This book, for instance, has nothing to say on the subject at all except a few words on p. 296, in reference to covering a period of business risk.

What the public want is : (1) A policy to safeguard the family against premature death of the bread winner. (2) A totally separate endowment insurance for his old age. Few people really care very much about leaving their relatives a windfall when they die at

70 or 80 years of age, and they are not prepared to make heavy sacrifices during their lives in order to do so. The ordinary full life policy is an unsatisfactory attempt to combine the two aims by a method which involves paying in addition for something which is not wanted. The companies should not wait for the public to ask for the policies suggested. The public are very slow to think out these things. The agents of the companies should thrust on people's attention the fact that policies of the kind suggested are the proper complement to endowment policies. If they think it necessary to safeguard themselves against bad risks of people who know themselves to be delicate, they can offer these policies only to those who also have endowment policies. C.F.B.

5.—*Old Age Pensions: their actual working and ascertained results in the United Kingdom.* By H. J. Hoare, B.Sc., LL.B., Clerk of the Local Pension Sub-Committee for Camberwell and Lewisham. With an Introduction by Sir Laurence Gomme, F.S.A. xi + 196 pp., fcap. 8vo. London: P. S. King and Son, Ltd., 1915. Price 3*s.* 6*d.* net.

The Old Age Pensions Act, 1908, came into force on January 1, 1909. By March 31, 1909, 647,494 pensions had become payable. In the following financial year the number increased to 699,372. By an amending Act, which came into force on August 18, 1911, certain disqualifications were removed, with the result that by March 31, 1913, the number of pensions payable had increased to 967,921, of which more than 62 per cent. were payable to women. The amount of pensions granted increased from 8,077,110*l.* per annum in 1909 to 12,315,061*l.* in 1913. The old age pensioners were at the latter date 21 per 1,000 of the total population, and 637 per 1,000 of the population aged 70 years and over. These and other interesting statistics are given by Mr. Hoare in his work. He has written it for the benefit of the social student and investigator, of the ordinary citizen who takes an interest in the minor workings of our governmental providence, and of persons engaged in actual administration, and all of them will find it useful and interesting. It is the part of a critic to find fault, and that we should note but one trivial slip is a strong testimony to the general accuracy of the book. Lord Rothschild's Committee (p. 7) was not a "Select" Committee, but a Departmental Committee appointed by the Treasury. No reference is made to Sir Edward Hamilton's Committee, appointed by the Local Government Board, which reported on the cost of the scheme favoured by Mr. Chaplin's Committee.

The readers of the book will probably be surprised to find how many difficult and delicate points have arisen in settling the question: What are the yearly means of a poor old person? If they are more than 31*l.* 10*s.* he gets no pension at all, and he cannot get the full pension of 5*s.* a week if they are more than 21*l.* As a matter of fact 94 per cent. of the pensions granted are at that full rate. The clear statement of these points by Mr. Hoare, who is qualified by practical experience to discuss them, will be of great value to the numerous bodies engaged in the administration of the Act. How complex these points are may be inferred from the circumstance that on some of them the Inland Revenue authorities, who appoint the Pension officers, do not agree with the Local Government Board, which is the final Court of Appeal.

In Sir Laurence Gomme's introduction he takes occasion to refer to the good work done by Mr. Hayes Fisher as chairman of the London Committee. The writer of this notice desires, from his own experience, to join in that tribute, and also to give testimony to the good feeling and considerate care which have generally marked the administration of the Act by Pension officers and Pension Committees. E.B.

6.—*Women in Modern Industry.* By B. L. Hutchins, with a chapter contributed by J. J. Mallon. xix + 315 pp., 8vo. London: G. Bell and Sons, Ltd., 1915. Price 4*s.* 6*d.* net.

This very readable study of conditions and ideas of women in modern industry is preceded by a very brief historical sketch with the conclusion that "the women of the industrial classes have "always worked and worked hard. It is only in quite modern "times, so far as I can discover, that the question, whether some "kinds of work were not too hard for women, has been raised at "all."

The chapter on the industrial revolution shows a great advance in historical impartiality when compared with previous accounts. "The development of the single young woman's position through "the factory system has been obscured by the abuses incidental "to that system, which were due more or less to historical causes "outside industry. . . . The very fact of the size of the factory, "its economic importance, and its almost dramatic significance for "social life, caused attention to be drawn to, and wrath to be "excited by, evil conditions in the factory, which would have been "little noticed in ordinary small workplaces."

A chapter of well-selected statistics of the life and employment of women contains a reference to a statement that "the age group "15 to 20 shows very curious variations in the relative mortality "of males and females. From 1894 onwards the males of that "group have had a higher mortality than the females, whereas "previous to that date the female mortality was the higher in "all years of which we have a record save two—1876 and 1890." There is nothing very curious in this record if we examine the facts set out in the quinquennial summaries of death rates at that age period in the Registrar-General's Report for 1912, pages 26 and 27. During 1841–45 the male death-rate was 6·8 and the female death-rate was 7·7. Both rates have shown a steady decline, but that amongst girls has been more rapid throughout the period 1846 to 1910. Starting at a disadvantage, they were level with the boys from 1886 to 1895, and secured a slight advantage in subsequent quinquennia. The boys' rate fell to 3·0 in 1906–10 and the girls' to 2·8. The decline in juvenile maternity and the improvement in the sanitary and other conditions of employment of domestic servants are sufficient causes for the continuous change in favour of the girls.

The chapters on women in trade unions in the United Kingdom, America and Germany deserve careful consideration and criticism from an historical and economic point of view. The remarkable developments in the United States which have resulted in a joint board of sanitary control and a wage scale board appointed by manufacturers and trade unions in the costume, blouse and mantle trades are recent and will, no doubt, be included when a new edition is demanded.

Mr. Mallon discusses the statistics of women's wages in the wage census of 1906. He raises many questions to which he gives tentative answers, not always satisfactorily, but always suggestively.

It is characteristic of the time in which they live that neither Miss Hutchins nor Mr. Mallon attaches any importance to the difference between real and nominal wages and the greater or less enjoyment derived from special kinds of work as factors in determining women's wages. C.E.C.

7.—*La Belgique Industrielle et Commerciale de Demain.* Par Robert Billiard. (Preface de Henri la Fontaine.) xix + 275 pp., 8vo. Paris: Berger Levrault, 1915. Price 4 francs.

In this lucid and suggestive essay, the author, who, on account of superiority in resources both of men and goods, feels no doubt about the eventual triumph of the Allies over the Central Powers in the present European War, attempts with bold ingenuity to forecast the economic destiny awaiting his own country when the conflict is at an end and peace has been restored. Of the four parts of which the book consists the first is entitled the "German "Example." In this the marvellous industrial and commercial progress of the German Empire since 1870 is described. It is traced, as we think correctly, to conspicuous causes, in the organisation of transport and of banking, and of education, general and technical. The conquest of the world in the economic sphere which it is hardly an exaggeration to declare was, as a consequence of this striking advance, in sight, has now been exchanged for the retreating " will " of the wisp " of military domination. But it has left behind not a few obvious and instructive lessons for the " new Belgium " portrayed in the second section of this treatise to appreciate and follow. After urging in the earlier chapters electoral reform, improvement of the means of carriage and the methods of instruction, the development, in their due rank, of maritime cities of primary and secondary importance, and the general encouragement of the trades and industries pursued, or to be pursued, by his countrymen, the author proceeds to consider in turn the past condition, the present state, and the future possibilities, of particular species of business enterprise. The third division of the essay is devoted to the more arduous and elusive and less concrete and manageable problem of the prevention of the occurrence of and the removal of the occasion for warfare; and in the fourth and final part the reasoning of the whole thesis is summarised.

The writer, it should be noted, does not win the entire approval of the contributor of the preface for all his views. His advocacy, for example, of a protective policy to be initiated and maintained by the victorious Allies in common against their beaten foes arouses the suspicion of M. la Fontaine, whose inclinations may not unjustly be considered ultra-pacificist. But generous praise is mingled with some disagreement, and we can cordially endorse the eulogium passed on the suggestiveness at least of some of the proposals here put forward for the mitigation or suppression of military and naval strife. M. Billiard's confident expectation that France and England will give economic help to Belgium after the war is over, which will extend beyond the immediate necessary rehabilitation of her destroyed industrial equipment, and will prove a more than adequate substitute for her previous growing business intercourse with Germany, rests on a basis that incredulous impugners of pacificism may regard as comparatively firm. Of the substantial accuracy and the evident relevance of the facts and figures cited neither they nor any other interested readers of these pages can entertain a doubt. The book forms an opportune contribution to a necessary discussion. L.L.P.

8.—*The Evolution of the English Corn Market from the Twelfth to the Eighteenth Century.* By N. S. B. Gras, Ph.D. xiii + 498 pp., 8vo. Cambridge, Mass.: Harvard University Press, 1915. Price $2 50 c.

Dr. Gras is an indefatigable student and his researches in the Record Office, the British Museum and other collections have enabled him to make very important additions to the materials which were available for the study of the subject by Faber and Naudé. So much of our knowledge of English trade in the time of Elizabeth consists of information about the organised trading of companies which had their centre in London, that students will be grateful to him for printing the *Speciall Direction for Divers Trades* which appears to have been written by a west country merchant in the late sixteenth century (p. 429). It gives a survey of the ports of many countries, and enumerates the classes of goods which were likely to find a sale at each. More important for the history of the corn trade is his account of the experiment of giving a bounty on the export of corn which was tried under Charles II (p. 144). This experiment was soon forgotten, and has been unknown to historians; by calling attention to it Dr. Gras has thrown fresh light on the origins of the policy which dominated the English corn trade in the eighteenth century.

His treatment of the earliest period is also suggestive, as he lays stress on manorial marketing; the lords of the manors had the means of conveying corn to market, and it is quite likely that the author is right in thinking that trade connections were determined by proprietary rather than by geographical convenience, and that the supply available depended not so much on the demand, as on the desire of the producer to realise a portion of his stock. The grouping of manors in the same hands was a most important fact, and doubtless had much influence in diffusing a better tradition of land management, but it is not clear that these groups had much solidarity, and each manor seems to have maintained its character as a unit for purposes of account.

While Dr. Gras makes great use of the materials which Thorold Rogers collected, he is severe upon his inaccuracies, and holds that his method was "inconsistent and arbitrary" (p. 39). It is true that Rogers was too much inclined to regard mediæval statistics as self-interpreting, and that, great as were his services as a pioneer, his results have not always been confirmed by later students. But it may be doubted whether the method which Dr. Gras has adopted in dealing with local markets is much more satisfactory. He has given us a map of England which professes to delineate the local price areas from 1250 to 1500 A.D. (p. 47). Statistics show what districts "have a strong tendency to a differential price level" (p. 42), and the areas are delineated from the information thus obtained. But the local historian may be inclined to regard these areas as "arbitrary." Lynn was an important centre of the corn trade in the marsh land, as well as a port for a large area, but this is not indicated in the map. The book would have gained in consistency if the principle which Dr. Gras uses in regard to London (p.123) had been adopted for local markets also, and they had been treated as "price-"making centres." It would then have been possible to treat the history of markets as primarily one of increasing demand, and to consider in different periods the places from which the supply was drawn. Had this principle been adopted throughout, the historical treatment need not close abruptly, but would be a suitable introduction to the examination of the further evolution of the English corn market under the impulse of the industrial revolution.

The corn trade has been the very heart of English economic life, and the story of its development throws light on the progress of agriculture, the growth of intercommunication and internal trade, as well as the intercommunication with other countries. On this last topic Dr. Gras's work is very valuable, both for more modern and for mediæval times; he has called attention to the large export trade which was carried on from Lynn in the early fourteenth century (p. 111) and the important official positions which Lynn capitalists attained (p. 173). But his references to agricultural progress do not give the impression that he has mastered the subject. Owing to their close relations with Flanders, Kent agriculturists introduced improvements in the cultivation of hops and other special crops in the seventeenth century, but it is doubtful whether this influence had much effect on the production of corn for the market. Norfolk was a great arable district, but when Henry Best spoke of it as a "champion" county he merely meant that open field cultivation prevailed (p. 53). Most surprising of all is the statement (p. 14) that the production per acre increased 150 per cent. during the thirteenth century. That bailiff farming was greatly improved by such "skilled agriculturists," to use Professor Maitland's phrase, as Walton of Henley is likely enough, but we have no reason to believe that there was any change in the system of land management. We know from Mr. Hubert Hall's edition of the *Pipe Roll* (p. xix) that on the Winchester manors bailiff farming was not superseded in the thirteenth century by another system; and to take 1250 as a date when local marketing took the place of manorial marketing is greatly to antedate the rise of a class of enterprising tenant farmers who worked for the local market. Indeed the term local market is much too vague to be employed to designate any precise phase in the "evolution "of the corn market." Such a local market as Farnham only rose into great importance in the seventeenth century when it felt the stimulus of the demand from London.

The author is confident that the sources at his disposal make him to give a new reading of the corn policy. He complains that Faber's monograph "was written solely from printed sources, a particularly "serious fault when it is remembered that the date of composition "was 1888, since which time so much has been printed that is "really essential to an understanding of the subject" (p. 474). But corn policy is a very complex thing (p. 211), and Dr. Gras does not appear to have the gift of the lucidity which is required to make the various factors clear. He has a great deal to say about "mercantilism" but seems uncertain whether the term means the encouragement of "shipping, manufactures, fisheries and agriculture" (p. 140), or whether it is synonymous with an industrial policy, or whether it aims at national "self-sufficiency" (p. 255). Though the competition in grain markets was chiefly between dealers, such as carriers and millers and bakers, he insists that "the out and "out wholesaler as a class was practically non-existent in the "purely domestic corn trade" (p. 172). His metaphors are not always well-chosen; he writes that "the network of corn currents "to the central or home manors for the personal needs of the "proprietor was crossed by another network of currents evolving "out of the growth of a territorial marketing system" (p. 22); and again he asks, "what was the leaven behind the development of "servile labour to the free contractual basis, the second important "progressive move in the history of labour?" The book also suffers from oversight in regard to details. *Yorts*, for *ports* (p. 173), may be a printer's error; the author, however, must be held responsible for the use of *drags* for *drage* both in the text and index, for writing the Bishop of *Constance* instead of the Bishop of *Coutances* (p. 1), and for referring to the editor of the *Black Book of the Admiralty* as Sir Travers Twist (p. 469). W.C.

9.—*On the relation of Imports to Exports.* By J. Taylor Peddie, F.S.S. v + 88 pp., 8vo. London: Longmans, Green and Co., 1915. Price 2*s.* 6*d.* net.

The author is very uneasy at the (normally) "growing expansion" of our imports over exports. In one place (p. 14) the excess is mainly ascribed, in the usual way, to our financial, shipping, and insurance services to the rest of the world. In another place (p. 44) the "growing" excess (before the war it was not "growing") is less satisfactorily attributed, on the one hand, to our increasing dependence on external sources of food supply, and on the other hand, to the diminishing dependence of other nations on the products of our labour. The root of the evil, however, is our Free Trade policy, which lets in imports that should be produced here, and under which our international shipping, financial, and insurance operations have flourished at the expense of home industries. To this policy is due our failure to meet the Germans on an equality in the matter of munitions—the facts are ignored that Germany started the war with a vast accumulation of munitions, and with munition factories, designed to supply an army numbering millions of men, while we had based our activities in this direction on the requirements of an army numbering only a few hundred thousand; and that in the short space of eighteen months our industries have adapted themselves to the immense demands of this war.

The German menace, we are told, makes it desirable for us to increase our population. But the Free Trade system stands in the way. Under it we find it difficult to maintain a population beyond 48,000,000. How does Mr. Peddie know this? Each generation has had grounds for thinking that this country had about reached the limit of its population at the prevailing standard of life, but the succeeding generation has belied the anticipation. We cannot set a limit to the future population that might be maintained in comfort in this country under the Free Trade or any other system.

We are finally told, of course, that if we would escape disaster in the future we must do various things under the shelter of restrictions on the importation of manufactured "articles of utility," accompanied with colonial preference.

Besides the essay which bears the title given to the book, is a second essay on "Foreign Exchange—the Bill of Exchange." This essay is the better of the two in its expository sections. But it is spoiled at the end by another attack on the Free Trade policy, which is made responsible this time for the fall in the rate of exchange between this country and the U.S.A. Does not Mr. Peddie see that other explanations may be possible, and, if not, how does he explain the fall in the exchange value of the franc and the mark?

A.D.W.

10.—*English Public Health Administration.* By B. G. Bannington, Inspector of Nuisances, County Borough of West Ham. xiv + 338 pp., 8vo. London: P. S. King and Son, Ltd., 1915. Price 7*s.* 6*d.* net.

The book we are told in a prefatory note seeks to treat the public health department as an administrative unit of the system of local government by providing a survey of its administrative technique. It aims at serving the needs of students and of those interested in public health, and at the same time the requirements of the junior officials engaged in public health administration.

That Mr. Bannington succeeds in reconciling these divergent aims is a tribute to the skill with which he marshals a vast detail of technical fact and presents it in a form which is at once interesting and at the same time so judiciously classified as to form a most useful reference guide to the practical administrator. The note of the book is its practical erudition. This is possible in a writer who has an intimate acquaintance with the technique of his subject, such as is gained only in a prolonged and varied practice of the matter to which it relates.

The fault of the book is that imposed by the limitations of the subject from the standpoint of the writer. An official appointed to administer the law relating to public health is necessarily concerned with the statutory provisions which have been enacted, their interpretation according to precedent and practice, the powers granted, omitted or withheld, and the amendments needed to give effect to the aims which the legislature has endeavoured to attain. "The inspector of nuisances," as the Public Health Act of 1875 has so inadequately and unfortunately named the important official who has come to be more suitably known as the "sanitary inspector," is, as Mr. Bannington points out, "something of a builder, a plumber, "a butcher, a doctor, a veterinary surgeon, a lawyer and a clerk." But most of all, judging from Mr. Bannington's book, he is something of a lawyer. And perhaps the main value lies in the forensic perspective which comes from a wide experience of the technical administration of sanitary law. The statistician will find little of interest in this treatment of a subject matter which has been materially shaped by statistical method, but the method of treatment is none the less valuable to those for whom the book is ostensibly written.

The book contains a vast amount of technical information, easy of reference, well arranged, sound and reliable in character and essentially practical in value. W.B.

11.—*The Japanese Problem in the United States. An Investigation for the Commission on Relations with Japan appointed by the Federal Council of the Churches of Christ in America.* By H. H. Millis, Professor of Economics, University of Kansas. xxi+333 pp., 8vo. New York: The Macmillan Company, 1915. Price 6*s*. 6*d*. net.

This book is a frank and conscientious exposition of the different phases of what is known in America as the Japanese "problem." The author is well qualified to discuss the subject, as in addition to spending considerable time in personal investigations for the book he was in charge of the inquiries made some years ago by the American Immigration Commission into the same subject.

The Japanese population in the United States numbers about 90,000–100,000. Before 1898, in no single year did the Japanese influx exceed 2,000, but from that date up to 1906 the volume of immigration was very much greater and created the "problem."

The same disposition to exclude them manifested itself in America as has been shown to exist in British Columbia and Australasia. A good proportion of the Japanese who went direct to America were young men of intelligence and ambition drawn from the middle classes, seeking wider opportunities for study or for gaining a livelihood than existed in their native land. Many more came from Hawaii, these being drawn from the poorest and most ignorant classes. More than half of the total immigrants were under 25 years of age, and more than half, again, were described as farmers or farm labourers.

The chief occupations, other than agriculture, in which the immigrants found employment were on railways, in lumber mills and in fish canneries, while practically the only instances in which they appeared as employers were as laundrymen and tailors. On the railways they were at first engaged at wages lower than those received by immigrants of any other nationality, but owing to their efficiency, reliability and freedom from brawling the demand for their labour resulted in their wages being increased at least to the standard received by European immigrants. In the lumber mills, however, hostile public opinion checked their employment, while the fish canneries attracted the least desirable type of immigrant, and the attitude of the larger employers was decidedly unfavourable to the Japanese. In laundry-work the efficiency of Japanese methods caused the white employers to fear their competition, and in California several "anti-Jap laundry leagues" were organised to place every difficulty in the way of the newcomers.

The book does great credit to its American author and the American Council which authorised its publication. It may hardly be palatable to many Americans, as while free from malice on the one side, it extenuates nothing on the other. E.C.S.

12.—*Economic Origins of Jeffersonian Democracy.* By Charles Beard. ix + 474 pp., 8vo. New York: The Macmillan Co., 1915. Price 10*s.* 6*d.* net.

This closely reasoned essay, supported, as it is, by an elaborate examination of the evidence available, and clinched by a full judicial *résumé* of the significant conclusions to which that testimony demonstrably conducts, might not inaccurately be called a convincing sermon on the edifying text of the "economic interpretation of "history." Accordingly, although its interest is perhaps mainly political, it deserves and will receive an attentive wholesome hearing from economists. The erudite author contends persuasively that at the very outset of the history of the American Commonwealth the parties which were fundamentally in conflict at its birth were, on the one hand, the capitalist and financial classes favouring the Constitution and its honest provisions for the maintenance of public credit, and, on the other hand, those agrarian interests to whose claims Jefferson paid afterwards his chief regard, although he too was careful then not to alienate the necessary countenance of monied men by unnecessary tampering with approved finance. Nevertheless Hamilton's policy of strict observance of what was due—perhaps exceeding the bare obligation—to the creditors both of the Federation and of its constituent elements, the individual States, and his encouragement of manufactures by Protection, and his proposed use of the capital made fluid through the medium of the funded Debt for the end of economic progress, secured from the beginning the favour and assistance of the business classes and their representatives, and encountered throughout, as the writer of this treatise urges, the misgiving and hostility of those who were imbued with the ideas and animated by the motives characteristic of Jeffersonian Democracy. The struggle did not end with the close of the lengthy arduous battle over the Constitution. During Washington's occupation of the high office of President the essential principles of the controversy reappeared. The subsequent election of Jefferson to this supreme post, viewed from the standpoint of such historical knowledge, was the culmination of a process started some while before and steadily pursued. As opportunity offered, the leading commercial and industrial interests clashed with those of land and labour, and the economic side of the political contest became evident. Professor Beard questions the validity of the arguments advanced against this view by earlier researchers. He advances his own case with great skill and admirable lucidity and we doubt whether it can be effectively rebutted. It certainly possesses the merit and exercises the attraction of an adequate and reasoned explanation of the salient facts of an important epoch of American development; and it illustrates the light that can be thrown opportunely by economics upon politics. L.L.P.

13.—*English Railways.—Their development and their relation to the State.* By E. Cleveland-Stevens. 332 pp., 8vo. London: George Routledge and Sons, 1915. Price 6*s.* net.

This book is a distinct addition to the valuable series of monographs which form the London School of Economics Series. It is the third and most important of that series which deals with the subject of railways, a subject which has received scant attention at the hands of English writers on economics.

Before any comprehensive history of our railways can be written, it is essential that a series of investigations take place dealing with different aspects. Mr. Cleveland-Stevens' work may be counted as the first of such investigations, and it covers the history of the consolidation movement up to the close of the nineteenth century. In the fifteen years which have since elapsed, the movement in the direction of railway combination has made rapid strides and the study of that movement leaves room for a supplementary volume which we hope the author may find time to write at a later date.

The railway consolidation movement did not introduce a new principle into the transport history of Great Britain. Our early railway legislation bears the marks of the road and canal legislation which had preceded it, and railway amalgamation finds its forerunner in the canal amalgamation which began half a century before.

The great difficulty in dealing with an investigation of the character here undertaken is to estimate the value of authorities. Although the author takes up a fine judicial attitude, he is distinctly inclined to exaggerate the value of the current literature of the period. The railway journalists were generally hot partisans either of the railways or of their opponents, and it is dangerous to attach too much weight to their views. The difficulty is that except for the records of such bodies as Royal Commissions, Parliamentary and Departmental Committees little other information is available. Is it too much to hope that in the not distant future some of the archives of the great railway companies will be allowed to see the light? We have little doubt in that case that many impressions will have to be modified. Until this time arrives it is doubtful whether any man can get a true perspective without some practical experience in a railway company's service. Traders have set forth their views very clearly on many occasions, but railways as the defending party have rarely if ever shown their whole case.

In spite of this it is to be hoped that members of our legislature may read the book and wake to a realisation of the haphazard nature of the control exercised by Parliament over our railways. Parliament has utterly failed to devise a comprehensive scheme of railway systems or railway control. The result has been waste, for much of which the railways are in no way responsible. The public inevitably pay for such waste in the end in higher rates and fares. It is this lack of systematic control which raises the greatest doubts as to the likelihood of railway nationalisation in this country proving an economic or social success. Control by Parliament exercised spasmodically, perchance under the stress of Party conflict, does not hold out much prospect of a nationalised system rendering a service to the country more valuable than that rendered by the railways to-day. Whether the railways continue as private enterprises or are nationalised, the whole history of the past shows the need for systematic control to supersede the hand-to-mouth control of the past. W.T.S.

14.—*Railway Problems in China.* By Mongton Chih Hsu, Ph.D. (Columbia University Studies). 184 pp., 8vo. London: P. S. King and Son, 1915. Price 6*s*. net.

15.—*The Nationalization of Railways in Japan.* By Toshiharu Watarai, Ph.D. (Columbia University Studies). 156 pp., 8vo. London: P. S. King and Son, Ltd., 1915. Price 5*s*. net.

The history of railways in China is bound up with the history of the political conflicts of foreign nations for a share in the Chinese markets. The tale is, in many ways, a sordid one. It is very doubtful whether any of the foreign countries really cared two straws about China. Rather they saw a great country, capable of producing great wealth and of furnishing a great market, and each of the nations strove to obtain as large a share of this potential wealth for herself and her citizens.

Out of all the Great Nations, England stands out as having one particular merit. However hard were the bargains she drove, and however dishonest were some of her people who constructed and exploited the railways, she alone among the nations appears to have striven for the principle of the "Open Door." Mr. Hsu, who has little good to say for the foreigners who have built so many of the Chinese railways, admits that Great Britain "has pursued the "wisest course in China—the course of the 'Open Door' and equal "commercial opportunity."

From the time of the Russo-Japanese War, however, foreigners have played a less important part in the construction of railways in China. Government and provinces have both undertaken railway construction, and Chinese private enterprise has been encouraged by concessions. In 1909 the Pekin-Kalgan Railway was completed, and it has the distinction of being the first railway built entirely under Chinese supervision, with Chinese capital and Chinese labour. The line was built at a very reasonable cost, and is earning excellent returns. Since that event there has been a movement in the direction of nationalization of the railways, but it is clear that China is not in a position financially to build more than a tithe of the railways she requires. Concessions are still being made to foreign firms on a large scale, and the Government is contenting itself with nationalizing such provincial railways as will form sections of the future trunk systems, and building a limited amount of new line. Chinese co-operation with foreign firms is a marked feature to-day and the Chinese Government is generally well represented in the future management of the conceded lines.

Much as China wants additional railways for her development, Mr. Hsu sees one great danger ahead of her. China has continually guaranteed the interest on railway loans, and certain internal revenues have been pledged as security. "Whenever internal disturbances "may arise, or whatever other unforeseen causes may come up to "impair the due payment of interest or the repayment of principal," Mr. Hsu concludes, "China's sovereignty will be at stake."

The problems of railways in Japan are very different. As an island country, Japan has excellent opportunities for communication by sea between most important places, and further the mountain ridge running down the centre of the Island of Honshiu limits the possibilities of railways very considerably. Japan is then far less dependent on railways than most countries, and it is much open to doubt whether she was wise in her nationalization policy.

In a country where the railways have a practical monopoly the arguments in favour of national ownership are very strong, but when the railways are in active competition with other forms of transport, it is a very different case. The shipping trade of Japan is still largely carried on with sailing ships. The natural harbours are good, but much remains to be done in the way of providing adequate dock accommodation. Now the Government has got such a huge stake in the railways, it is less likely to encourage the shipping industry, which might injure the railways. Already there are signs that it is a principle of the railway policy to transport all freight by land. It is admitted, however, that the nationalization was carried out on military rather than economic grounds. The private railways failed to rise to the occasion at the time of the Russo-Japanese War, and the nationalization policy achieved a complete victory immediately after.

As regards the results of the nationalization, the estimated surpluses have not been realised, and there is no prospect of their early realisation. The effect on the national finances cannot be said to be good. The extension and improvement of the railways has not proceeded more rapidly than in the days of the private companies, nor has there been any material change in the rate policy. The existence of water transport keeps up competition on such a scale that the State administration must frame its rates to meet it in order to prevent the railways becoming a serious burden on the public purse. Mr. Watarai draws the almost inevitable conclusion that Japan has made a mistake by paying too much attention to distribution and too little to production—a mistake bound up in her purchase of the railway system.

Both books have a fault in common—the provision of an utterly inadequate map. So poor are the maps that they are all but worthless. We would also notice a remarkable error on p. 21 of Mr. Watarai's book. He states "the coast-line *of Japan* is more "than 7,040 miles, so that to every square mile it has about 9·28 "miles." The coast-line of Japan appears to be over 18,000 miles and the area about 173,780 square miles, so the position is actually some 9·5 square miles to every mile of coast-line. W.T.S.

16.—*Other New Publications.**

Abbott (*W.*). Commercial theory and practice. 352 pp., 8vo. London: John Murray, 1915. Price 3*s.* 6*d.* net.

[This book is intended as a text-book for the examinations of the Society of Arts and the Union of Lancashire and Cheshire Institutes and claims to be the only text-book completely covering the syllabus of those examinations. Its object generally is to give a brief account of the operations of commerce in its various departments and to outline the economic principles on which those operations are based.]

Anthonisz (*J. O.*). Currency Reform in the Straits Settlements. 160 pp., 8vo. London and Singapore: John Little and Co., 1915. Price 3*s.* 6*d.*

[The author, who was Treasurer of the Straits Settlements, has written this book with a view to giving detailed information as to the measures taken for establishing a Gold Exchange Standard in the Malay Peninsula. The book is divided into the following chapters:—I. Currency Changes and the Measures taken to Establish a Gold Standard. II. Effect of the Rise in the Price of Silver on the Currency System. III. Gold Legal Tender. IV. Subsidiary Coin of Limited Legal Tender and Supplementary Coin Possessing no Legal Tender. V. Reserves. VI. Remittances. VII. The Value of Standard in Relation to Foreign Trade. The book is well indexed.]

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* See also "Additions to the Library," page 144, *sqq.*

Bachi (*Riccardo*). L'Italia economica nel 1914. Annuario della vita commerciale, industriale, agraria, bancaria, finanziaria e della politica economica. Anno vi. (Supplement to *La Riforma Sociale*, 1915). xvi + 314 pp., 8vo. Torino: Società Tipografico-editrice Nazionale, 1915. Price 5.50 lire.

[A valuable survey of the economic condition of Italy during 1914. The bibliography of economic publications, official and unofficial, issued in Italy during the year is most useful.]

Banerjea (*Pramathanath*), M.A. Study of Indian Economics. 2nd edition. xiii + 347 pp., sm. 8vo. London: Macmillan and Co., 1915. Price 4*s.* 6*d.* net.

[The first edition of this book was reviewed in the *Journal* for January, 1912, and in this edition the book has been thoroughly revised and much enlarged and several appendices have also been added.]

Black (*Clementina*). Married women's work. Being the report of an enquiry undertaken by the Women's Industrial Council. vi + 292 pp., sm. 8vo. London: Bell and Sons, Ltd., 1915. Price 2*s.* 6*d.* net.

[This report is based mainly on enquiries made during 1909 and 1910, the delay in publication being due to the war and other causes. It is a careful record of the social conditions of women engaged in different forms of employment in various parts of the country and tends to show that the problems of married women's work are much the same irrespective of locality or occupation.]

Bowley (*A. L.*), Sc.D. An Elementary Manual of Statistics. New Edition. vi + 220 pp., 8vo. London: Macdonald and Evans, 1915. Price 5*s.* net.

[The first edition of this book was reviewed in the *Journal* for April, 1910, and, as the author states, it is intended for the use of those desiring some knowledge of statistical methods and results. In the present edition, in addition to minor corrections, the tables have been brought up to include 1913, as those for 1914 would hardly be comparable with former years without much explanation.]

Braun (*H.*). Extra-Premien voor Verblijf van Verzekerden Buiten Europa. 129 pp., 8vo. Rotterdam: Nationale Levensverzekering-Bank, 1915.

[Deals with the extra premiums required to be paid by those resident in tropical and semi-tropical countries, with special reference to the Dutch colonies.]

Brend (*William A.*), M.D., &c. Enquiry into the Statistics of Deaths from Violence and unnatural causes in the United Kingdom. 80 pp., 8vo. London: Charles Griffin and Co., 1915. Price 3*s.* 6*d.* net.

[The author remarks that the greater part of this thesis was written before the outbreak of war and that the suggestions made cannot at present be put into effect. It is hoped, however, that with the changes in Public Health administration to be made when practicable, increased attention will be directed to the means of reducing mortality from various forms of violence and unnatural causes.]

Burn (*J.*) and *Brown* (*E. H.*). Elements of Finite Differences, also solutions to questions set for part 1 of the examinations of the Institute of Actuaries. Part 1. Finite differences. Part 2. Questions. Part 3. Solutions. Part 4. Answers, without solutions. Second Edition. 289 pp., 8vo. London: C. and E. Layton, 1915. Price 10*s.* 6*d.* net.

[Certain important changes have been made in this new edition, which are set forth at length in the preface.]

Chapman (*Ernest H.*), M.A., B.Sc., &c. The Correlation between changes in Barometric Height at Stations in the British Isles. 21 pp., 8vo. 1915.

[Reprinted from the *Quarterly Journal of the Royal Meteorological Society* for July, 1915.]

Edsall (*Edward W.*). The Coming Scrap of Paper. 187 pp., 8vo. London: Allen and Unwin, 1916. Price 2*s.* 6*d.* net.

[The author's intention is to show that the gold standard upon which the whole nation's life is based has for years past been undermined by paper money (by means of the cheque system) and has, in fact, already been virtually destroyed. This process, the author contends, has opened the way to alterations in the commercial, agricultural and social relations of the national life that are fraught with untold possibilities for the welfare of every class of the community and eventually for the benefit of the world at large.]

Eggenschwyler (*Walter*). Die Schweizer Volkswirtschaft am Scheideweg Ratschläge zur Neu-Orientierung unserer Industrie. (Schweizer Zeitfragen. Heft 44.) 80 pp., 8vo. Zürich: Art. Institut Orell Füssli, 1915. Price 2 francs.

Fletcher (*Margaret*). Christian Feminism; a Charter of Rights and Duties. (Catholic Studies in Social Reform. viii.) 88 pp., sm. 8vo. London: P. S. King and Son, Ltd., 1915. Price 6*d.* net.

Guyot (*Yves*). La Province Rhénane et la Westphalie. Etude Economique. 144 pp., 8vo. Paris: Attinger Frères, 1915. Price 3 fr. 50 c.

[An historical and economic description of the Rhenish Provinces and Westphalia during the past century when these territories first came under Prussian rule. The mineral resources and iron and steel industries that have sprung up in these regions are described fully and it is shown how they have added to the power and wealth of the Empire. The book is divided into 22 chapters, and there is a bibliography and numerous charts and diagrams.]

Heckscher (*E. F.*). The Economics of the Great War. A Study of Modern economic life under the influence of the War. (In Swedish). 243 pp., 8vo. Stockholm: P. A. Norstedt and Söner, 1915. Price 4 kronor.

[An attempt to explain comparatively well-known facts relating to the economics of the war. Complete impartiality has been attempted throughout by the author, who has visited Holland, England, France and Germany in June and July of last year. The book is divided into the following chapters:—I. The Present Situation and Economic Science. II. Economics of War. III. The World's Commerce under the Influence of War. IV. Gold and War. V. Economic Preparedness for War. VI. Financing the War. VII. Prices and Price Regulation during the War. The treatment is non-statistical except, to a certain extent in Chapter III dealing with the commerce of the world under the influence of war.]

Henderson (*Robert*). Mortality laws and statistics. (Mathematical Monographs edited by Mansfield Merriman and Robert S. Woodward. No. 15). iv + 110 pp., 8vo. New York: John Wiley and Sons; London: Chapman and Hall, 1915. Price 5*s.* 6*d.* net.

[A concise statement of the essential facts and theoretical relations with regard to the duration of human life. The book is divided into the following chapters:—1. Mortality Tables; 2. The Mortality Table and Probabilities Involving One Life; 3. Formulæ for the Law of Mortality; 4. Probabilities Involving more than One Life; 5. Statistical Applications; 6. Construction of Mortality Tables; 7. Graduation of Mortality Tables; 8. North-Eastern States Mortality Table; and an Appendix, giving Data from Various Mortality Tables.]

Hirst (*F. W.*). The political economy of war. xii + 327 pp., 8vo. London: J. M. Dent and Sons, Ltd., 1915. Price 5*s.* net.

[This book has been written for students of political economy and for business men. It is intended as a critical examination of the economic causes and consequences of war in general. It deals with the cost of war, its effect on trade and exchanges, the methods of taxation and borrowing, with forced labour, indemnities, debts, sinking funds, the growth of armaments, and with the estimated cost and probable consequences of the present war.]

Ingram (*John Kells*), LL.D. History of Political Economy. New and enlarged edition with supplementary chapter by William A. Scott, LL.D., and introduction by Richard T. Ely, LL.D. 315 pp., 8vo. London: A. and C. Black, 1915. Price 7*s.* 6*d.* net.

[The first edition of this book, published in 1888, was reviewed in the *Journal* for September, 1888. Another edition was issued in 1893 and this apparently is the third edition. Dr. Ely in the introduction reviews the work of Dr. Ingram in the economic field and his influence on economic thought at home and abroad, and expresses the hope that the present revised edition brought down to date by the additional chapter written by Professor Scott will continue and enlarge Dr. Ingram's great work.]

Lipson (*E.*). Introduction to the Economic History of England. 1. The Middle Ages. viii + 552 pp., 8vo. London: A. and C. Black, 1915. Price 7*s.* 6*d.* net.

[It is pointed out by the author that, in recent years, there has been a large accession of printed materials for the study of English economic history which afford practically a virgin field for the investigator. The purpose of the present volume is to utilise both the older sources of evidence and the new material which is now available. The eleven chapters into which the book is divided deal with the following subjects:—1. The Origin of the Manor; 2. The Manor and the Open Field System; 3. The Break-up of the Manor; 4. The Agrarian Revolution; 5. The Growth of Towns; 6. Fairs and Markets; 7. The Gild Merchant; 8. Craft Gilds; 9. The Woollen Industry; 10. Foreign Trade; 11. Revenue and Exchequer; and there is a very full bibliography and an index.]

Maternity. Letters from working-women collected by the Women's Co-operative Guild. With preface by The Right Hon. Herbert Samuel, M.P. xi + 211 pp., sm. 8vo. London: G. Bell and Sons, 1915. Price 2*s.* 6*d.* net.

[This book is the result of an inquiry into the conditions of working-class motherhood carried out by the Women's Co-operative Guild. A series of questions were addressed to members as to their family history, and the wages and occupations of their husbands, and the replies have been embodied in this volume. It includes also some figures bearing on infant mortality and a Memorandum of the Local Government Board on maternity and child welfare.]

Morris (*Keith*). Anglo-Canadian Year-Book 1915-16. 336 pp., 8vo. London: William Stevens Ltd., 1915. Price 5*s.* net.

[A new publication issued primarily for those resident in the United Kingdom actively concerned with the Dominion and for whom and for others it will be found to be a useful work of reference.]

Oldershaw (*L.*), M.A. Analysis of Mill's Principles of political economy. 143 pp., sm. 8vo. Oxford: B. H. Blackwell, 1915. Price 2*s.* 6*d.* net.

[This book will be found most useful to students of Mill. It condenses into about 150 pages his voluminous "Principles," without obscuring the argument.]

Radford (*George*), M.A. The State as farmer, or the future of agriculture in England. 148 pp., sm. 8vo. London: Smith, Elder and Co., 1915. Price 2*s*. 6*d*. net.

[With a view to increasing the national food supply, the author suggests that agriculture should be under State control. He contends that there is no person or class specially interested in the true agricultural policy, and that the subject is one which concerns the State as a whole alone. The book is without preface or table of contents, or headings to the six chapters of which it is composed.]

Seton-Watson (*R. W.*). Roumania and the Great War. 102 pp., 8vo. London: Constable and Co., 1915. Price 2*s*. net.

[This essay is partly based on a lecture given to the Royal Scottish Geographical Society last February. The author's endeavour is to give the salient features of Roumanian history, and a brief estimate of its policy in relation to the war. In the Appendices statistics are given of the ethnographic and religious distribution of the people, upon which, the author contends, must necessarily rest any estimate of the probable frontier between Roumania and Hungary and between Roumania and Serbia, after the war.]

Sherwell (*Arthur*), M.P. The Russian Vodka monopoly. 31 pp., 8vo. London: The Temperance Legislation League, 1915. Price 4*d*.

[Portions of this pamphlet have already appeared in the *Contemporary Review*. It gives a brief account of the establishment of the monopoly and its objects and working, and its influence generally on the drinking habits of the Russian people.]

Smith (*Ellen*). Wage-earning women and their dependants. 36 pp., 8vo. London: Fabian Society, 1915. Price 1*s*. net.

[A report by the Fabian Women's Group on an inquiry begun three years ago. The inquiry has not been on a sufficient scale for the figures arrived at to be considered in any sense final, but they can be used as a basis for further investigation. It is claimed that the figures, as they are, are sufficiently surprising to require the reconsideration of many tacit assumptions about women workers, their dependants and their wages.]

Swain (*A. H.*). The war and life assurance. With-profits policy-holders' precarious position. 48 pp., 8vo. Leicester: The Insurance Press, 1915. Price 2*s*. net.

[The purpose of this pamphlet is to emphasise the necessity at the present time for with-profits policy-holders to combine among themselves for the protection of their own interests. The depreciation in the value of securities in addition to the unexpected claims upon insurance companies arising through the loss of life, by land and sea, has created an unprecedented situation which requires their vigilant care.]

Taussig (*F. W.*). Inventors and Money Makers. Lectures on some relations between Economics and Psychology delivered at Brown University in connection with the 150th Anniversary of the Foundation of the University. 135 pp., 8vo. New York: Macmillan and Co., 1915. Price 4*s*. 6*d*. net.

[The lectures, which have been amplified and annotated freely, deal only with those relations between economics and psychology which have to do with the phenomena of instinct.]

Wagel (*S. R.*). Chinese Currency and Banking. 457 pp., la. 8vo. Shanghai: The North China Daily News and Herald, Ltd., 1915. Price $10 or 18*s*. net.

[This volume is a sequel to the author's book "Finance in China," which was reviewed in the *Journal* for July, 1915. It gives an interesting account of the great variety of coins current in China and of the many currency experiments that have been tried in that country during its long

Wagel (S. R.). Chinese Currency and Banking—*Contd.*

history. The work is divided into two books and sixteen chapters, in which the author has detailed the broad principles on which the reform of currency and banking in China should be undertaken. One of the first essentials of reform is, the author contends, the unification of local currencies, and that until this has taken place there should be no disturbance by the introduction of a gold standard. If the silver standard is adopted, there can be no better unit than the Shanghai tael and its introduction would be facilitated if the native banks can be induced to co-operate with the Government for its introduction. The author promises two more books, one to deal with "Taxation in China," and the other on "Industries and Agriculture in China," to complete his survey of the general economic and financial condition of the country. This book, like Mr. Wagel's earlier work, is a laborious compilation, but has the defect of being diffuse and in parts irrelevant.]

Wells (S. Russell), B.Sc. (Editor). Germany's food—can it last? The German case as presented by German experts. English version, with a critical introduction by A. D. Waller, M.D., LL.D., F.R.S. xxxi + 232 pp., 8vo. University of London Press, 1915. Price 2*s.* net.

[This English translation of the book by Prof. Eltzbacher and his committee of professors and experts has been undertaken as being the best way of bringing before the British public the facts of the case as seen through German eyes. They contend that if their various recommendations are carried out the nation, even if isolated, cannot be starved. The book is written with typically German minuteness which has been adhered to in the translation as far as the differences in the two languages will allow.]

Wereide (Dr. Thorstein). Statistical Theory of Energy and Matter. 169 pp., 8vo. Christiania: Gyldendalske Boghandel Nordisk Forlag, 1915.

[A mathematical discussion of the principles of statistical mechanics, dealing with the problems of entropy, thermodynamics, kinetic theory of gases, radiation and the laws associated with the names of Gibb, Kirchhoff, Maxwell, Rayleigh and Planck.]

Italy. Dati statistici sui rimpatriati per causa di guerra e sulla disoccupazione. Fol. xxii + 156 pp. Rome, 1915.

[A report by the Italian Labour Department on the economic effects on the Italian labour market of the sudden return of numbers of Italians who were resident in other countries at the time of the outbreak of war and of the methods adopted to deal with the situation.]

Russian Year-Book for 1915. Compiled and edited by N. Peacock. viii + 623 pp., 8vo. London: Eyre and Spottiswoode, 1915. Price 10*s.* 6*d.* net.

[Certain changes have been made in this year's issue of the year-book owing to the war, which has also delayed its publication. There is a careful *résumé* of the economic and industrial state of Russia during the first six months of the war, an article on openings for British trade, and the complete text of the new Customs tariff, with the equivalents in English currency based on the normal rate of exchange.]

Sweden. Historical and statistical handbook, edited by J. Guinchard, second edition (English issue). First Part, Land and People. Second Part, Industries. 2 vols., 8vo. 2nd edit. Stockholm: Norstedt and Söner, 1914.

[The first edition of this handsome work was issued in 1904, and owing to the great changes in the economic and general life of Sweden during the last decade, a thorough revision of the whole work became necessary. Such statistics as are given have been supplied by the Swedish Central Bureau of Statistics.]

Switzerland. Statistique des Secours en nature alloués en 1912 sur le territoire des cantons du concordat pour l'assistance en nature en Suisse. 70 pp., 4to. Berne: Stampfli and Co., 1915.

[An enquiry into the extent and methods of poor relief in kind in different Swiss cantons and of the means available for its better regulation.]

——— Der Schweizer Volkswirt (L'Economiste Suisse). Monatsschrift für Handel, Verkehr, Steuerwesen, Sozialpolitik und praktische Geschaftsorganisation. Jahrgang 1. Hefte 1 and later issues. 1915. La. 8vo. Zürich: Art. Institut Orell Füssli, 1915. Price 50 centimes.

Canadian Municipal Statistics, 1915. 299 pp., sm. 8vo. London and Toronto: Wood, Gundy and Co., 1915.

[The present edition has been carefully revised and brought up to date and will be of value to those interested in Canadian municipal investments. It includes as a new feature a summary of the law relating to municipal borrowing in certain of the provinces of the Dominion.]

Annual Cotton Handbook for daily cable records of America, East Indian and Egyptian crops, together with Brazilian, Liverpool and Continental statistics; containing much useful and reliable information for the cotton trade. Season 1915–16. 45th year of publication. Sm. oblong 8vo. London: Comtelburo, Ltd., 1915.

[Several new features have been adopted in this issue, in addition to bringing all the sections of the book up to the latest available periods.]

Dominions Royal Commission. Memorandum and Tables relating to Food and Raw Material Requirements of United Kingdom. Prepared by the Commission. [Cd.–8123.] 124 pp. London: Wyman and Sons, 1915. Price 1*s.*

England and Wales. Hospitals. Return as to Hospital accommodation in England and Wales. Prepared by the Local Government Board. 96 pp., fol. London: Wyman and Sons, 1915. Price 3*s.*

London County Council. Comparative Municipal Statistics. Statistics of sixteen great towns in United Kingdom, compiled by London County Council from information supplied by the authorities of the several towns and from other sources. Vol. 1. 1912–13. xxviii + 156 pp., 8vo. London: P. S. King and Son, 1915. Price 5*s.*

[The County Council some years ago decided to compile a volume of comparative municipal statistics on the lines of those issued in some foreign countries. The co-operation of other great municipalities was sought, and as the result of a conference of officials it was decided to publish a preliminary survey, following as far as possible the lines of the "London Statistics" already published by the Council. The work has been delayed by the war, and the Council hopes that the work will be leniently judged. Mr. Geoffrey Drage in an instructive preface emphasises some of the uses of a work of this kind and the difficulties involved in its compilation.]

CURRENT NOTES.

IN connection with the death of the Society's late President, the Right Hon. Lord Welby, it should be stated that on the day of the funeral, November 4, 1915, a Memorial Service was held at St. Margaret's, Westminster, and among the many people present who had assembled to pay a last tribute of respect to his memory were the following representatives of the Society:—

Sir Alfred E. Bateman, K.C.M.G.; Sir Edward Brabrook, C.B.; Sir Ernest Clarke; the Right Hon. Lord Courtney; the Right Hon. Lord Eversley; Mr. A. W. Flux, M.A.; Mr. Bernard Mallet, C.B.; Mr. R. H. Rew, C.B.; Dr. T. H. C. Stevenson; and Mr. G. Udny Yule, M.A.

The trade accounts for the complete year 1915 show that while the import trade has recovered from the set-back of the early months of the war, at any rate as far as value is concerned, the exports show a reduction on the aggregate for 1914. The figures for 1914, however, include the exports of seven months prior to the outbreak of war, and reference to preceding issues of the JOURNAL will show that the record for the year 1915 compares favourably with that for the first twelve months of war.

The expansion in the value of the imports is in no small degree traceable to the rise in prices, particularly in prices of foodstuffs. A noteworthy feature is the recovery in the value of imports of articles wholly or mainly manufactured, especially when it is remembered that a large addition would be made under this heading if the imports of munitions and equipment on Government account were included in the record. Apparently the food imported for the use of the military forces and the bulk, at any rate, of raw materials needed for the manufacture in this country of military supplies, are included in the record of imports.

The decrease in the exports of coal is mainly responsible for the reduction in exports under Class II, while most classes of manufactured goods contribute to the heavy reduction in Class III.

The figures relating to bullion and specie would appear to fall considerably short of a complete account of the movements into and out of the country since the outbreak of war, and are in striking conflict with the record of the daily movements of bullion at the Bank.

The shipping figures are of unusual interest. So far as foreign shipping is concerned, the larger part of the decrease is traceable to the exclusion of enemy shipping from overseas trade. When allowance is made for this, the decrease in foreign shipping entered is one-fifth, and in foreign shipping cleared one-tenth approximately. Thus a substantially larger proportion than formerly of the foreign shipping which left with cargoes brought cargoes on arrival in this country.

This feature is even more strikingly shown in the figures of British shipping, as the tonnage cleared with cargo was even less than that entered with cargo. Probably the requisitioning of vessels for Admiralty service may account for this, without the necessity of assuming that foreign vessels secured a preference over British vessels in the matter of outward cargoes.

The comparison of the figures of shipping with those of the values of imports and exports suggests that the available tonnage has been more fully utilised during the war than previously. In some degree this may be influenced by a relative decrease in the tonnage devoted to passenger and mail service, wholly or mainly, as compared with that concerned mainly in the transport of merchandise.

The following figures compare the twelve months ended December, 1915, both with the preceding twelve months, and, more particularly, with the twelve months ended December, 1913. Our usual tables have been modified so as to permit of a comparison of figures relating to a year of peace with those of the first complete calendar year of war :—

Imports. Value c.i.f.	Twelve months ended December, 1915.	Twelve months ended December, 1914.	Twelve months ended December, 1913.	Increase (+) or Decrease (−) in 1915 compared with 1913.
	£ '000.	£ '000.	£ '000.	£ '000.
I. Food, drink and tobacco....	381,901,	296,969,	290,202,	+91,699,
II. Raw materials and articles mainly unmanufactured	287,341,	236,532,	281,823,	+ 5,518,
III. Articles wholly or mainly manufactured	181,515,	160,490,	193,602,	−12,087,
IV. Miscellaneous and unclassified (including parcel post)	2,999,	2,644,	3,108,	− 109,
Total merchandise	853,756,	696,635,	768,735,	+85,021,
Bullion and specie	21,389,	70,595,	74,029,	−52,640,

Exports. Value f.o.b.	Twelve months ended December, 1915.	Twelve months ended December, 1914.	Twelve months ended December, 1913.	Increase (+) or Decrease (–) in 1915 compared with 1913.
Produce and manufacture of the United Kingdom—	£ '000.	£ '000.	£ '000.	£ '000.
I. Food, drink and tobacco	24,996,	26,949,	32,588,	– 7,592,
II. Raw materials and articles mainly unmanufactured	52,355,	56,713,	69,905,	– 17,550,
III. Articles wholly or mainly manufactured	292,788,	338,634,	411,368,	–118,580,
IV. Miscellaneous and unclassified (including parcel post)	14,508,	8,426,	11,384,	+ 3,124,
Foreign and colonial merchandise—				
I. Food, drink and tobacco ...	22,384,	17,442,	15,942,	+ 6,442,
II. Raw materials and articles mainly unmanufactured	54,574,	53,858,	64,038,	– 9,464,
III. Articles wholly or mainly manufactured	21,781,	24,089,	29,458,	– 7,677,
IV. Miscellaneous and unclassified	58,	85,	137,	– 79,
Total British, foreign and colonial	483,444,	526,196,	634,820,	–151,376,
Bullion and specie	45,979,	41,488,	62,142,	– 16,163,

Shipping. Net Register Tons.	Twelve months ended December, 1915.	Twelve months ended December, 1914.	Twelve months ended December, 1913.	Decrease in 1915 compared with 1913.
British—	Tons '000.	Tons '000.	Tons '000.	Tons '000.
Entered with cargo	22,862,	28,929,	32,292,	– 9,431,
Cleared with cargo	20,380,	32,516,	40,101,	–19,721,
Foreign—				
Entered with cargo	10,864,	14,132,	16,772,	– 5,908,
Cleared with cargo	19,149,	23,453,	27,718,	– 8,569,
Total, British and foreign—				
Entered with cargo	33,726,	43,061,	49,064,	–15,339,
Cleared with cargo	39,529,	55,969,	67,819,	–28,290,

In the *Labour Gazette* for January the Board of Trade summarises the information collected concerning the course of retail food prices since the commencement of the war. The following table shows the average percentage increase at the beginning of each month of 1915, as compared with the prices of July, 1914 :—

	Per cent.		Per cent.		Per cent.
January	18	May	26	September	35
February	22	June	32	October	40
March	24	July	32½	November	41
April....	24	August	34	December ...	44

Between December 1, 1915, and January 1, 1916, there was an increase of less than 1 per cent., and accordingly the average percentage increase at the end of the year 1915 may be put at 45 per cent. above the prices prevailing immediately before the war. The articles included are beef and mutton (British and imported), bacon, fish, flour, bread, tea, sugar, milk, butter, cheese, margarine, eggs, and potatoes. Taking the average for the year, the level of retail food prices in 1915 was higher than in July, 1914, by 33 per cent. in large towns and 29 per cent. in small towns and villages. The percentage rise in large towns is practically the same as that given by the source from which is derived the Board of Trade's series of index-numbers for retail prices of 23 articles of food which goes back to 1892. The value of this index-number for 1915 is 148·6 against 116·8 in 1914.

Food prices in Berlin, according to the tables in the *Labour Gazette*, based upon returns published in the Prussian *Statistische Korrespondenz*, have risen rapidly since the summer. In June the rise as compared with July, 1914, was 65·4 per cent.; in July, 69·6; in August, 75·3; in September, 78·4; in October, 93·2; in November, 82·0.

The apparent fall in November is wholly artificial and due to the operation of recent orders of the Federal Council under which maximum prices have been fixed in Berlin for such important goods as butter, lard, pork and bacon, at a level well below those locally current in the uncontrolled market.

For Vienna less detailed information is available, but it is estimated that, in October, the general level of retail food prices showed an advance of over 117 per cent.

The rise in wholesale prices continued with little interruption during the later half of 1915, as shown by the following summary of the *Statist* and the *Economist* index-numbers: the *Economist* figures refer to the end of the month.

Month.	*Statist* index-number.	*Economist* index-number.
June	106·4	147·7
July....	106·4	149·1
August	107·0	149·8
September	107·8	151·6
October	110·0	153·2
November	113·1	159·1
December	118·4	165·1

For June, 1914, the *Statist* index-number was 81·2, giving a rise of 46 per cent. from the beginning of the War up to the end of 1915 as compared with a rise of 31 per cent. up to June. The *Economist* number was 115·9 at the end of June, 1914, giving a rise of 42 per cent. to the end of the year as against 28 per cent. to the end of June. For the year 1915 the *Statist* number is 108, against 86 for 1914 and 85 for 1913. Over the last eighteen months the group of vegetable foods shows the greatest rise, viz., 77 per cent.; the group of sundries comes next with 50 per cent. and minerals third with 40 per cent.

The *Gazette Average* price of British wheat, after a sharp fall in September, rose again in November and December to about the same level as in July—August. The following are the monthly averages for the second half of the year: July, 52*s.* 3*d.* per quarter; August, 54*s.* 2*d.*; September, 43*s.* 7*d.*; October, 46*s.* 4*d.*; November, 53*s.* 0*d.*; December, 53*s.* 6*d.*

Employment, as indicated by the trade union returns, has continued to improve since June, the percentage of members returned as unemployed at the end of November and December reaching the remarkably low figure of 0·6, the lowest figure yet recorded. The returns for the Insured Trades give a slightly less favourable picture, but this group is dominated by the building and engineering trades, and in the former there has been some seasonal increase of

Month.	Percentage unemployed at end of month.	
	Trade union returns.	Insured trades.
July....	0·9	1·0
August	1·0	0·9
September	0·9	0·9
October	0·8	0·8
November	0·6	0·9
December	0·6	1·1

unemployment. The average percentage of trade union members unemployed in 1915 as a whole is 1·1 per cent. only. The woollen and worsted, jute and hosiery trades continue to be well occupied and all report a shortage both of male and female labour; in the cotton trade also the labour problem has become more acute.

The following table is based on the employers' returns for wages paid in the principal textile trades:—

Percentage change in wages paid in the last week of each month as compared with the corresponding week of the preceding month.

Month.	Cotton.	Woollen.	Worsted.
July	+ 1·7	+ 2·1	+ 1·0
August	− 0·4	+ 0·4	− 1·1
September	− 3·1	+ 0·2	+ 2·5
October	+ 2·4	− 1·3	+ 0·8
November	− 2·2	− 0·2	− 0·3
December	+ 1·3	+ 2·1	− 0·2

The total number of workpeople who were reported to the Department, during the year, as having received war bonuses or increases of wages, is 3,165,000, and the total amount of increase in the wages of these workpeople was over 603,000*l.* per week, an average of about 3*s.* 10*d.* per head. These figures exclude changes affecting seamen, railway servants, agricultural labourers, police, Government employees, and domestic servants, shop assistants and clerks. There has been relatively little change in the normal hours of labour: changes affecting 13,657 workpeople amount in all to a reduction of 34,221 hours.

The following abstract for five of the principal unions, and for the aggregate of all unions making returns, continues the data given in previous issues of the JOURNAL concerning unemployment in Germany. The figures are taken from returns of the *Reichsarbeitsblatt* published in the *Labour Gazette.*

Month.	All unions making returns.	Building trade operatives.	Metal workers (Soc. Dem.).	Textile workers (Soc. Dem.).	Wood-workers (Soc. Dem.).	Factory workers (Soc. Dem.).
June	2·5	1·4	1·4	5·0	4·0	1·0
July	2·7	1·3	1·5	6·4	3·7	0·9
August	2·6	1·0	1·4	8·1	3·5	1·0
September	2·6	0·9	1·3	10·4	2·7	0·8
October	2·5	0·9	1·0	11·4	2·4	0·9
November	2·5	4·4	1·0	9·2	2·3	1·0

On the average, the percentage of unemployment has changed but little. In the textile trades it has risen considerably.

The U.S. Department of Labour, Bureau of Labour Statistics, has issued a report on "Index-numbers of wholesale prices in the "United States and Foreign Countries" (Bulletin, No. 173). The aim of the Bulletin is "to make the index-numbers of wholesale "prices currently published in the United States and foreign "countries more accessible, more intelligible and therefore more "useful." Part I deals with the history of index-numbers, the difficulties of measuring changes in the level of prices, the characteristics of price fluctuations and the various methods used and gives a comparison of the leading American index-numbers from 1890 to 1913 to illustrate some of the difficulties. Without entering into the analysis given of the sources of discrepancy it is interesting to notice that the net change in the price level between 1890 and 1913 is made twice as great by two of these six series as it is by two of the others; that the maximum difference between any two series for a given year averages over 11 points and that in a year of such a decided business character as 1908 two of the series show a rise of 6 to 8 points, while four indicate a fall of 7 to 12 points. Part II of the volume gives the principal wholesale index-numbers of the United States, Australia, Austria-Hungary, Belgium, Canada, Denmark, France, Germany, Great Britain (Board of Trade, *Economist*, Sauerbeck), India, Italy, Japan, the Netherlands, New Zealand, Norway, Russia and Spain, stating the history of each index-number in brief and giving the commodities included. The compilation should prove an exceedingly useful one.

We have also not yet noticed Bulletin 170 of the same Bureau, issued in May last, which deals with foreign food prices as affected by the war. It is based principally upon data furnished by the Department of State through its Consular Service in Europe and relates in the main to the period between August 1 and December 1, 1914, though in a few instances the figures have been brought down to a later date. Prices are given from 18 countries and represented by reports from over 100 towns, cities, or consular districts. The outbreak of war was followed almost universally by a sharp rise in prices. Within a fortnight the first panic was over and prices began to sink again, but thenceforward the movements differed largely and were greatly dependent on local circumstances. The report states the various measures adopted by different governments to deal with the situation.

The report on "Butter prices from producer to consumer," given in Bulletin 164 of the Bureau, deals with a number of interesting points, such as the analysis of the price paid by the retailer into its several components. The following may be given as an illustration (p. 7):—

December, 1911.

	$
Price paid to farmers for butter-fat in 1 lb. of butter, delivered at creamery	0·3297
Creamery margin per lb.	0·0289
,, price per lb. f.o.b. shipping station	0·3586
Freight per lb.	0·0073
Cartage per lb.	0·0003
Gross price per lb. paid by receiver or wholesaler	0·3662
Receiver's or wholesaler's margin per lb.	0·0187
Price per lb. paid by retailer	0·3849
Retailer's margin per lb.	0·0492
Price per lb. paid by consumer	0·4341
Total margin between price per lb. for butter paid by consumer and price for butter-fat therein paid to farmer at creamery	0·1044

Another interesting point is the varying magnitude of the "overrun" or excess of the butter made from a given quantity of milk as compared with the butter-fat therein. This ranges from 7 to 25 per cent. Eagerness to increase the overrun inevitably led to legislation, but the minimum percentage of butter-fat required ranges from 80 to 82·5 per cent. in different states and has not been fixed in all.

The Government statistician, Mr. Malcolm Fraser, has issued a report on the Cost of Living in New Zealand, 1891–1914. (Wellington. Price 1*s.*). The inquiry covers retail prices of groceries, dairy produce and meat, the course of house rents, and fuel and light. In the last case it was not possible to carry the complete inquiry back to 1891 in all centres: the data were only complete from 1907. The general treatment has been similar to that adopted in the Australian inquiry. A schedule of all the commodities is drawn up and a weight assigned to each proportionate to the estimated total consumption in the country; the cost of this schedule at the prices of each year is the basis of the system. Fifty-nine commodities are included, viz., 31 groceries, including tobacco and soap as well as foodstuffs, 7 articles of dairy produce, including under this head ham and two cuts of bacon, and 21 items of meat, viz., 9 cuts of beef, 5 of mutton, 4 of pork, beef and pork sausages and tripe. As the base, was taken the average annual expenditure, on the schedule, of the four chief cities, for the five years 1909–13. The prices of the first group—groceries—fluctuated so largely that it is difficult for the eye to disengage the general trend from the diagram, though from 1904 onward prices seem to have moved round a somewhat higher average level. The most marked feature is a fall of some 30 per cent. in the price of sugar. In the case of dairy produce there has been a marked and fairly steady rise, the index-number moving from 806 in 1891 to 1,050 in 1913 and 1,054 in 1914. The movements of meat have been more irregular and more divergent in the different towns, but again there has been on the whole a marked rise from 864 in 1891 to 1,047 in 1913 and 1,158 in 1914. For the three groups together the index-number rose from 896 in 1899 to 1,037 in 1913 and 1,098 in 1914—owing to incomplete data for Christchurch a general average cannot be given for 1891. For rents the index-number rose from 698 in 1891 to 842 in 1899, 1,036 in 1913 and 1,048 in 1914 For coal it rose from 798 in 1891 to 1,006 in 1913 and 1,041 in 1914. A supplementary investigation shows monthly changes of prices since the outbreak of war. In August, 1915, as compared with July, 1914, groceries had risen by some 17 per cent., dairy produce by rather more than 11 per cent., meat by 10 per cent., or a general rise of rather over 13 per cent. Detailed tables in the appendix show the actual prices of the commodities included.

Bulletin 157 of the U.S. Bureau of Labour Statistics is devoted to the Statistics of Industrial Accidents. The writer admits the limited utility of the available data, which consist solely of the numbers of deaths from different causes. The numbers occupied—either as a whole or in age groups—are not known, and the result is that death-rates cannot be stated. The only ratio that can be given is the percentage of deaths due to accidents or injuries—a figure which is apt to mislead. The accident statistics of the State of New York, Massachusetts, Illinois and Wisconsin are specially discussed, as well as the data of the Prudential Insurance Co. of America. The experience of this country, as well as of Germany and of Austria, is also examined, and the standardisation of industrial accident reporting, classification, &c., is considered in some detail.

The Census data regarding the blind population of the United States were obtained in part from the schedule employed in the enumeration of the general population, and in part from a special schedule posted to each person who was reported as blind. Bulletin 130 of the Bureau of the Census summarises the main facts which can be brought out by a tabulation of the data on the general population schedule; it will be followed later by a special report on the blind, which will include the additional information secured by means of the special schedule. The number of blind returned at the Census of 1910 was 57,272, or 623 per million of the population, against 64,763, or 852 per million at the Census of 1900. These numbers cannot, however, be safely compared. In 1900 a separate schedule was used, to be filled in by the enumerator, for which service he received 5 cents; on the other hand nearly 20,000 persons reported as blind who failed to return a special schedule of enquiry were omitted. In 1910, as stated, the first return was made on the ordinary population schedule without special payment, and all persons so reported have been included in the tabulation unless enquiry showed that the first report was erroneous. No special definition of blindness was attempted. A classification by race, nativity and age shows that in all ages above childhood, foreign-born whites show the lowest rates of blindness, native whites the next, negroes considerably higher proportions, and the remaining group of "all others" the highest proportion of all. Thus at ages 40 to 44, foreign-born whites have 305 per million blind; native whites, 544; negroes, 1,019; and all others 1,660. At ages 70 to 74 the proportions are 3,849, 4,424, 8,473, 18,976. The relatively low ratios for the foreign-born whites are stated to be due "of course" mainly to the fact that under normal circumstances the number of blind immigrants will always be very small. At the same time the restrictive provisions of the immigration law have probably resulted in making the immigrants entering the country a specially selected class so far as blindness is concerned. Trachoma is an absolute bar to admission in the case of any immigrant affected with it. In the Chinese and Japanese population, concentrated in the years of early and middle adult life, the proportion of the blind is relatively low, and this somewhat interrupts the regularity of the apparent incidence on the class of "all others" as compared with negroes and whites.

The First Report of the Medical Research Committee (National Health Insurance) was issued in November last. Passing over the large amount of valuable research work of more purely medical interest which the Committee is undertaking, in many cases in connection with the war, it may be noted that the Statistical Department, of which Dr. John Brownlee is Director, is now conducting the whole compilation of the Statistics of the sick and wounded from the Home and the Expeditionary forces. Card indices are being compiled from the returns provided from official sources, and typists are engaged at military hospitals throughout the country to secure the rapid collection of information from the hospital books. The Committee refer to this as "the largest and most costly single undertaking" of the work that has been done for the Army Medical Department and other Government Departments. The services of Dr. Brownlee and his assistants have also been given to a special statistical investigation of the male population of the German Empire and its distribution in present circumstances, and the results of this have been supplied to H.M. Government.

The *Journal of the Institute of Actuaries* for October, 1915, contains an important paper by Mr. George King, F.I.A., on "The New National Life Tables." Mr. King was responsible not only for the Life Tables published in the first part of the Supplement to the Registrar-General's 65th Annual Report but also the Report on the Graduation of Ages at the Census of 1911. The paper under notice dealt in detail with criticisms made by other members of the actuarial profession on those reports. One matter referred to in the paper and by speakers in the subsequent discussion has received attention in this JOURNAL, viz., the fact that at each census the number of females aged 20-24 in England and Wales exceeded the number aged 10-14 at the previous one. Mr. King favoured the view that this feature is not due to such an extent as has frequently been claimed to misstatement of age, but is partially caused by net immigration of females of the relevant ages between the censuses. It was pointed out in the discussion that the phenomenon was not noticeable in the statistics of other nations where immigration of young females was no less to be anticipated than in this country, but a satisfactory method of ascertaining the extent to which misstatement of age occurs at the census has still to be devised.

A further paper in the same journal of interest to the statistician is that by Dr. J. F. Steffensen dealing with the relation between the method of moments and the method of least squares, this arising out of actuarial criticisms on previous papers published by the same author in the *Proceedings of the Fifth International Congress of Mathematicians.*

The following analysis of books published during 1915 is reprinted from the *Publishers' Circular* of January 1, 1916 :—

The European War has naturally had an effect on the publishing activity of the United Kingdom, and the number of books recorded as having been published during the year is 872 below the total for 1914. This decrease is not so formidable as might have been anticipated, and the figures are a tribute to the enterprise and vitality of British publishing, and are a hopeful sign for the future. It may be noted that the decrease is proportionately greater in the totals for new editions than for new books.

As we pointed out last year, the average quality of the books published at present is probably somewhat lower than during pre-war days, owing partly to a reluctance to place on a disturbed market works requiring a great outlay, and partly to the appearance of numerous ephemeral works dealing with the war.

Classified analysis of books published during the year 1915.

Classes of Literature.	New books.			New editions.	Totals for 1915.	Totals for 1914.
	New books.	Translations.	Pamphlets.			
Philosophy	184	4	15	34	237	179
Religion	650	17	65	164	896	969
Sociology	508	9	135	42	694	699
Law	157	2	39	60	258	279
Education	209	1	53	30	293	315
Philology	171	2	12	31	216	185
Science	566	2	44	86	698	840
Technology	395	1	42	82	520	687
Medicine, Public Health, &c.	239	4	28	85	356	454
Agriculture, Gardening	190	—	19	15	224	198
Domestic Arts	52	—	—	5	57	88
Business	149	—	9	28	186	155
Fine Arts	193	2	11	19	225	204
Music (works about)	33	3	1	8	45	55
Games, Sports, &c.	60	—	1	14	75	149
Literature	263	17	10	88	378	480
Poetry and Drama	374	31	33	129	567	642
Fiction	843	33	1	816	1,693	2,112
Juvenile	447	3	4	128	582	631
History	631	17	52	63	763	454
Description and Travel	350	3	40	90	483	554
Geography	108	1	58	15	182	64
Biography	308	18	4	64	394	442
General works	171	—	3	2	176	300
Military and Naval	309	3	87	68	467	402
Totals	7,560	173	766			
	8,499			2,166	10,665	11,537
Totals for 1914	8,863			2,674	11,537	

The decrease has been spread over most classes of literature, but it may be noted that the largest decrease, 419, is in fiction. Science with a decrease of 142, and technology with one of 167 are two other classes that have been most greatly affected. On the other hand, the total for history has increased by 309 and geography by 118, and several other classes also show increases.

It should be noted that in the above classes, "education" includes only books about educational theory and practice, and not text-books on special subjects, which are classed elsewhere; and also that under "music" only works about music are recorded.

Large though the yearly total is, it would be possible to swell it to a much greater figure by counting numerous leaflets (Government and other), ephemeral pamphlets, the publications of borough councils and other local government bodies, and musical texts. While it is obvious that our total could be increased greatly by the inclusion of all this literary protozoa, the figures would not represent so accurately the book publishing activity of the United Kingdom.

The following totals of the last ten years are of considerable interest:—

Year.	New books.	New editions.	Total.
1906	6,985	1,618	8,603
'07	7,701	2,213	9,914
'08	7,512	2,309	9,821
'09	8,446	2,279	10,725
'10	8,468	2,336	10,804
'11	8,530	2,384	10,914
'12	9,197	2,870	12 067
'13	9,541	2,838	12,379
'14	8,863	2,674	11,537
'15	8,499	2,166	10,665

In the appended tables each book is counted as one, whether it is in one or more volumes. Serials that appear later as a collected

Analytical table showing books published each month during 1915.

	Jan.	Feb.	March.	April.	May.	June.	July.
New	525	593	507	680	610	616	497
Translations	12	11	12	17	12	17	13
Pamphlets	51	76	63	100	67	49	47
Total new books	588	680	582	797	689	682	557
New editions	137	188	168	197	222	180	182
Totals	725	868	750	994	911	862	739
Total for 1914	1,008	998	1,142	988	1,131	989	810

	August.	Sept.	Oct.	Nov.	Dec.	Totals 1915.	Totals 1914.
New	454	719	858	733	768	7,560	7,925
Translations ...	10	18	31	11	9	173	198
Pamphlets	59	92	24	50	88	766	740
Total new books	523	829	913	794	865	8,499	8,863
New editions	132	179	234	229	118	2,166	2,674
Totals	655	1,008	1,147	1,023	983	10,665	11,537
Total for 1914 ...	427	853	1,244	1,106	841	11,537	

volume are counted as an ordinary book on the appearance of that volume; so that, for example, the series of "statutory rules and orders" issued by the Government, and amounting to several hundred in the year, are counted as one item on the appearance of the annual collected volume. The same rule applies to volumes of magazines, &c. Further detailed information regarding the year's publishing is supplied by the appended analytical tables.

The following is from the *Quarterly Publications of the American Statistical Association* for December, 1915:—

A Division of Statistical Research was organized in the Bureau of Records of the New York City Health Department on June 1, 1915. The creation of such a division has long been contemplated by the Department, and repeatedly recommended by special committees.

It is hoped that the new division will justify its existence from the start, and thus secure a reasonable amount of support in the next budget. The new division hopes to take over the statistical work of the different bureaux of the department, and in this way to secure a saving of labour that can be devoted to the development of the department's statistics. The division will then be able to supply the bureaux of the department with scientific data to guide them in their different fields of health work.

The new division has been organized entirely without additional cost to the city, by detailing qualified workers from within the department. Shirley W. Wynne, M.D., Assistant Registrar, Manhattan, has been appointed as Chief of the new division.

The New Year's Honours List included the names of the following Fellows of the Society:—Mr. David A. Thomas, who has been raised to the Peerage and has taken the title of Baron Rhondda of Llanwern; and Mr. M. M. Simeon Gubbay, who has been made a Commander of the Order of the Indian Empire.

Dr. A. Fillassier has recently been appointed Chief of the Bureau of Municipal Statistics of the City of Paris, in succession to Dr. Jacques Bertillon, who is now in charge of the French medical statistics of the War.

The death of the late Charles A. Conant, which occurred last autumn, deprives the United States of one of its foremost banking and economic authorities. His History of Modern Banks of Issue and Principles of Money and Banking are standard works on these subjects.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

Accountants' Magazine—

November, 1915—Income Tax: *M'Lintock* (*William*). (*Continued in December issue.*)

January, 1916—Railways. The Position of British Railways under Government Control during the European War.

Bankers' Magazine—

August, 1915—The Great Crisis (*continued in later issues*). War Loans, Interest and Banking Deposits: *Gibson* (*A. H.*). British and French Trade: *Benham* (*R.*). The Compradore: *Spalding* (*W. F.*). Canada's New System of Banking Education: *Eckardt* (*H. M. P.*). The Bank of France.

September, 1915—The Use of Notes instead of Gold: *Palgrave* (*Sir R. H. Inglis*). United States Trade Development with South and Central America: *Clausen* (*J.*). The Gold and Currency Problem: *Gibson* (*A. H.*). Canada and the War: *Field* (*F. W.*).

October, 1915—Increase in Notes in Circulation: *Palgrave* (*Sir R. H. Inglis*). Effect of the War Loans on Savings Bank Deposits: *Gibson* (*A. H.*). The Imperial Bank of Germany.

November, 1915—The Reports of the Banks of France, Germany and the Netherlands. Bank of the Netherlands, 1914–15.

December, 1915—Increase in Notes in Circulation: *Palgrave* (*Sir R. H. Inglis*). The Excess Profits Tax: *Gibson* (*A. H.*). Bank of the Netherlands, 1914–15.

January, 1916—Progress of Banking in Great Britain and Ireland during 1915. The Great Crisis: XVIII. Financing the War. War Finance: *Gibson* (*A. H.*). Trade after the War: *Good* (*E. T.*). Paper Currency and the Rise in Prices: *Mellor* (*Harold*). The "Forward" Movement in American Finance: *Clausen* (*John*).

Biometrika. Vol. XI. Parts I and II. November, 1915—On the Association of Temperature, Pulse and Respiration with Physique and Intelligence in Criminals: *Whiting* (*Madeline H.*). Variation and Correlation of the Number of Umbel Rays of some Umbelliferae: *Cool* (*C.*) and *Koopmans* (*A. N.*). On the Partial Correlation-Ratio. Part ii. Numerical: *Isserlis* (*L.*). Correlation of Anthropometrical Measurements in Cairo-born Natives: *Orensteen* (*M. M.*). A Study of the Crania of the Moriori or Aborigines of the Chatham Islands, now in the Museum of the Royal College of Surgeons: *Thomson* (*Eveline Y.*). Note on the Probable Error of the Coefficient of Correlation in the Variate Difference Correlation Method: *Ritchie-Scott* (*A.*). On certain Types of Compound Frequency Distributions in which the Components can be individually described by Binomial Series: *Pearson* (*Karl*), F.R.S. W. F. R. Weldon's Mice Breeding Experiments, Record of Matings.

UNITED KINGDOM—*Contd.*

Economic Journal—

September, 1915—The Artificial Regulation of Wages in Australia: *Beeby* (*G. S.*). Industrial Arbitration in New South Wales: *Russell* (*F. A. A.*). The Australian Democracy and its Economic Problems: *Eggleston* (*F. W.*). Non-Parliamentary Industrial Legislation: *Tillyard* (*F.*). On Paying for War by Loans: *Bickerdike* (*C. F.*). The Economics of War in Germany: *Keynes* (*J. M.*). The South Wales Coal Strike: *Carter* (*G. R.*). The Housing of the Scottish Farm Servant: *Drummond Smith* (*J.*). Some Factory Statistics of 1815–16: *Clapham* (*J. H.*).

December, 1915—The Public Finances of Italy: *Einaudi* (*Prof. L.*). War Economics: *Lawrence* (*F. W. Pethick*). The Sequel of the Welsh Coal Strike: *Carter* (*G. R.*). The Government and the Wheat Trade: *Hubback* (*J. H.*). A Note on Post-War Finance: *Hook* (*A.*). British War Finance: *Foxwell* (*Prof. H. S.*). The Bank of England and "Suspension of the Bank Act." The Political Economy of War: *Cannan* (*Prof. E.*). Economists on War: *Edgeworth* (*Prof. F. Y.*). The Rise of Prices in India: *Williams* (*Prof. T. T.*).

Eugenics Review. January, 1916—Law and Eugenics: *Macdonell* (*Sir John*), K.C.B. Some Aspects of Immigration to the United States in Relation to the Future American Race: *Ward* (*Prof. Robert de C.*). War and the Breed: *Jordan* (*Chancellor David Starr*).

Financial Review of Reviews—

September, 1915—Our National Resources: *Watt* (*H. A.*), M.P., and *Hynes* (*T.*), LL.B. Great Britain's Investments Abroad: *Wright* (*A.*). The United States and International Finance: *Pratt* (*Dr. E. E.*). Investment in New Countries: *Taylor Smith* (*H.*).

December, 1915—The Principal Dowry of this Kingdom: *Yerburgh* (*R.*), M.P. Foreign Investments and the War: *Gardener* (*J.*), M.A. Japan's Part in the War: *Lowry* (*R. L.*). Munition Securities as War-time Investments: *The Editor.* New Taxation and the Investor: *Sanders* (*William*).

Journal of the Institute of Bankers—

November, 1915—A Historical Survey of the Position Occupied by the Bank of England as regards the other Banks of this country, the State, and the Financial and Commercial Community generally, with especial reference to the Present Position of the Bank: *Burrell* (*H. V.*).

December, 1915—Inaugural Address of the President, the Right Hon. Lord Inchcape.

January, 1916—Foreign Reimbursement Credits: *Evitt* (*H. E.*), Cert.A.I.B.

Journal of the Royal Sanitary Institute. January, 1916—The National and Social Aspects of the Lowered Birth Rate: *Parkes* (*Louis C.*).

UNITED KINGDOM—*Contd.*

Proceedings of the Royal Philosophical Society of Glasgow. 1914-15—The Economic Dislocation of the War: *Smart* (*Prof. W.*). Some Motives for Colonisation: *Keith* (*Miss T.*). The Working of Conciliation Boards in the Coal Trade, with special reference to Scotland: *Nimmo* (*Adam*).

Quarterly Journal of the Royal Meteorological Society. October, 1915—The Wet Winter of 1914-15: *Mill* (*Dr. H. R.*) and *Carter* (*H. E.*). Discontinuities in Meteorological Phenomena: *Turner* (*Prof. H. H.*). Battle Weather in Western Europe, 9 months, August, 1914, to April, 1915: *Harding* (*C.*).

Transactions of the Manchester Statistical Society, 1914-15—Incidental Activities of an Education Committee: *Hey* (*Spurley*), B.A. Influence of Sun-spots on Prices: Professor Jevons's Theories Explained: *Hesketh* (*W. T.*). The Longest Price of War: *Saleeby* (*C. W.*), M.D. Occupations of the People of England and Wales in 1911 from the point of view of Industrial Developments: *Welton* (*Thos. A.*).

Journal of the Board of Agriculture—

November, 1915—Influence of the War on Supplies and Use of Feeding Stuffs: *Halnan* (*E. T.*). German Agriculture and the War. Co-operative Farm Implement Societies: *Wibberley* (*T.*).

December, 1915—Cost of Winter Feeding in Milk Production: *Garrad* (*G. H.*), N.D.A. Women's Work in Agriculture in Peace and War.

IRELAND—

Journal of the Department of Agriculture and Technical Instruction for Ireland. No. 1. *October*, 1915—The Marketing of Irish Produce. Technical Education and Industrial Prosperity: *Fletcher* (*George*). Food Production in Ireland.

UNITED STATES—

Actuarial Society of America. Transactions. Vol. xvi. Part I. No. 53. 1915—Taxation of Life Insurance Companies: *Craig* (*J. M.*). Should we Prepare a new Mortality Table? *Moir* (*H.*). Practical Treatment of Underaverage Lives: *Hunter* (*Arthur*). Valuation of the Death Benefits Provided by the Workmen's Compensation Law of New York: *Olifiers* (*Edward*). Income Tax on Annuities. (Federal Income Tax Act of 1913): *Thompson* (*J. S.*). A Staff Pension Fund: *Walker* (*Dwight A.*).

American Economic Review. December, 1915—The Expansion of Europe in Population: *Willcox* (*W. F.*). Third Factor in Variation of Productivity: *Watkins* (*G. P.*). Economic Aspects of Japanese Immigration: *Millis* (*H. A.*). Agricultural Credit Legislation and the Tendency Problem: *Putnam* (*G. E.*). Economic Aspects of the Panama Canal: *Huebner* (*G. G.*).

American Journal of Sociology—

July, 1915—Value and Social Interpretation: *Boodin* (*J. E.*).

UNITED STATES—*Contd.*

American Journal of Sociology—Contd.

September, 1915—Wealth and its Ways: *Keasbey* (*L. M.*). The Social and Economic Basis of the Administration of Rural Education: *Lull* (*H. G.*). The Mobility of the German Woman: *Zeeb* (*F. B.*).

November, 1915—Chicago Housing Conditions. X. Greeks and Italians in the Neighborhood of Hull House: *Walker* (*N.*). Income and the Principle of Service: *Yarros* (*V. S.*). An Application of Statistical Method: *Dewey* (*F. A.*). Certain Social Effects of Individualistic Industry: *Boggs* (*T. H.*).

American Statistical Association (*Quarterly*). *December*, 1915—The Service of Statistics in Problems of War and Peace: *Durand* (*E. Dana*). Some Population Statistics of the Pacific Coast States: *Willcox* (*W. F.*). On the handicapping of the first Born. A criticism of Professor Pearson's 1914 Memoir: *Dublin* (*Louis I.*) and *Langman* (*Harry*). Vital Statistics work in California: *Leslie* (*G. D.*). Theory of Statistical Tabulation: *Watkins* (*G. P.*). Vital and Monetary Losses in the United States due to Preventable Deaths: *Forsyth* (*C. H.*). Joint Committee on Standards for Graphic presentation. New Method for Computing the Moving Average: *King* (*Willford I.*). Comparative Militarism: *MacDonald* (*Arthur*). Wholesale Prices for the United States, 1801–40: *Hansen* (*Alvin H.*). The Present Position of Infant Mortality: Its Recent Decline in the United States: *Hibbs* (*Henry Horace, Jr.*).

Annals of American Academy of Political and Social Science—

July, 1915—Contains a series of articles by different authors on America's interests as affected by the European War grouped under the following heads:—Part I. America's International Trade as affected by the European War. Part II. Relations of the United States with Central and South America as affected by the European War. Part III. America's Financial Position as affected by the European War. Part IV. American Neutrality and the European War.

September, 1915—Contains a series of articles by different authors on America's interests after the European War grouped under the following heads:—Part I. America's Industries as affected by the European War. Part II. Stability and Development in America's International Trade. Part III. American Industrial Supremacy through Efficiency in Business Organization. Part IV. Industrial Conservation through World Peace.

November, 1915—Contains a series of articles by different authors on Public Budgets grouped under the following heads:—Part I. The Budget Idea and the National Budget. Part II. State Budgets. Part III. Public Budgets and Efficiency in the Public Budgets. Part IV. Development of Budgets and Budgetary Procedure in Typical Cities.

UNITED STATES—*Contd.*

Bankers' Magazine (New York)—

October, 1915—The Economic Endurance of the European Belligerents. National Banks and the Federal Reserve System: *Mortimer (F. C.)*. Foreign Exchange Problems Arising from Our Billion Dollar Trade Balance.

November, 1915—The War in Europe as an Agent of Economic and Moral Regeneration: *Greene (Charles Thomas)*. Dangers in Too Much Legislation—Bureaucratic Interference With Banking: *Weeks (Hon. John W.)*. Mobilizing American Dollars: *MacGregor (T. D.)*.

December, 1915—National Bank Reserves: *Seay (George J.)*. Speciality Advertising by Banks: *Morehouse (W. R.)*. Bank Publicity: *MacGregor (T. D.)*.

Casualty, Actuarial and Statistical Society of America. Proceedings. Vol. I. Part 3, 1915—Schedule Rating in Compensation Insurance: *Rubinow (M. I.)*. Development, Application and effect of schedule Rating in Liability and Compensation Insurance: *Hansen (Carl M.)*. The Effect of Schedule and Experience Rating on Workmen's Compensation Risks in New York: *Senior (Leon S.)*. Schedule Rating Considered from an Actuarial Point of View: *Mowbray (Albert H.)*. Notes on the Theory of Schedule Rating: *Whitney (Albert W.)*. Schedule Rating of Permanent Injuries: *Michelbacher (G. F.)*. Liability Loss Reserves: *Rubinow (I. M.)*.

Journal of Political Economy—

July, 1915—Waterways: Their Place in Our Transportation System: *Fisher (Walter L.)*. The Economics of Jitney Bus Operation: *Doolittle (F. W.)*. The American Gold Fund of 1914: *Arnold (John J.)*. The Movement for Public Labor Exchanges: *Leiserson (William M.)*.

October, 1915—Canadian Financial Problems: *Donald (W. J. A.)*. War and Public Finance in South America: *Jones (Chester Lloyd)*. Workmen's Compensations and the Federal Congress: *Lindley (D. Clark)*. Working Hours of Women in Chicago: *Graham (Irene J.)*.

November, 1915—The Commerce of France in the Ninth Century: *Thompson (James Westfall)*. The Development by Commissions of the Principle of Public Utility Capitalization: *Heilman (Ralph E.)*. Some Financial Aspects of the International Mercantile Marine Company: *Saliers (Earl A.)*.

December, 1915—The Panama Canal and Transcontinental Railroad Rates: *Daggett (S.)*. A Setback for the Waterways Movement: *Moulton (H. G.)*. Recent Tendencies in the Reform of Forest Taxation: *Compton (W.)*. Protection of a Mortgagee's Interest in Real Property by Insurance: *Riegel (R.)*.

Political Science Quarterly. September, 1915—Canadian Government Annuities: *Carman (F. A.)*. The New Anti-Trust Acts: *Seager (H. R.)*. Going value: *Bauer (John)*. Railway Rate Theory and Practice: *Dewsnup (E. R.)*.

UNITED STATES—*Contd.*

Quarterly Journal of Economics—

August, 1915—The Concept of Value: *Clark* (*J. M.*). The Concept of Value Further Considered: *Anderson* (*B. M., Jr.*). A Rejoinder: *Clark* (*J. M.*). Germany's Financial Mobilization: *Bendix* (*L.*). Promotion as the Cause of Crises: *England* (*M. T.*). Capital Investments and Trade Balances within the British Empire: *Boggs* (*T. H.*). The British Taxes on Land Values in Practice: *Tucker* (*R. S.*). The Effects of Increment Taxes upon Building Operations: *Haig* (*R. M.*). The Tobacco Industry since the Dissolution of the Trust: *Tosdal* (*H. R.*).

November, 1915—The Progress of Pecuniary Valuation: *Cooley* (*C. H.*). The Scope of Workmen's Compensation in the United States: *Fisher* (*W. C.*). French Money, Banking and Finance During the Great War: *Levy* (*R. G.*). Price Maintenance in the Book Trade: *Tosdal* (*H. R.*). The California Casual and his Revolt: *Parker* (*C. H.*). The Influence of Economic and Industrial Conditions on Infant Mortality: *Hibbs* (*H. H., Jr.*). Social Insurance, Old Age Pensions and Poor Relief: *Woodbury* (*R. M.*).

Yale Review—

October, 1915—The Economic Aftermath: *Noyes* (*A. D.*). Compulsory Service in the United States: *Tricoche* (*G. N.*).

January, 1916—The Question of Preparedness: *Stokes* (*Anson Phelps*). Trials of an Old-fashioned College Treasurer: *Ladd* (*G. T.*).

DENMARK—

Nationalokonomisk Tidsskrift—

July–October, 1915—Tsklands Socialforsokring under Krigen: *Bramsnaes* (*C. V.*). Udlandets Prisregulering: *Mackeprang* (*E.*).

November–December, 1915—Pengenes Betydning i Verdenskrisen: *Thalbitzer* (*Carl*). Antallet af Sygedage i den Danske Befolkning: *Heiberg* (*Povl*). Tilbojeligheden til at Vaelge Samme Livsstilling som Foraeldrene: *Warming* (*Jens*).

EGYPT—

L'Egypte Contemporaine. Nos. 24–25. *November*, 1915—*January*, 1916—Note sur les effets de la Déclaration de surenchère: *Eeman* (*A.*). La capacité de la femme mariée en droit égyptien: *Goadby* (*F. M.*). La guerre et ses conséquences économiques pour l'Egypte: *Eid* (*Dr. A.*). Pour la repression de l'usure.—Notes sur la loi espagnole en vue de son adaptation pour l'Egypte: *Herreros* (*E. Garcia de*).

CUBA—

La Reforma Social—

August, 1915—La cuestion finlandesa: *Acevdo* (*L.*). La venta de municiones de guerra por los paises neutrales: *Gregory* (*Ch. N.*).

September, 1915—La situacion financiera internacional. Las heridas y las enfermedades en la guerra: *Osler* (*William*).

October, 1915—La verdadera Doctrina de Monroe: *Root* (*Elihu*).

FRANCE—

Bulletin de la Statistique Générale de France. April, 1915—Assistance. Pays divers: Allocations aux familles de militaires mobilisés. L'effort agricole de la France pendant six mois de guerre. Pays divers: Procédés de la statistique agricole. Coût de la vie. Suède: prix des denrées, loyers, &c., 1910–12. Retraites. France: retraites ouvrières et paysannes en 1913. Prix des denrées dans les lycées en 1913 et 1914.

Bulletin de Statistique. Ministère des Finances—

September, 1915—Production des alcools en 1914 et 1913. Les revenus de l'État. Le monnayage en Allemagne en 1913, en 1914 et durant le premier semestre de 1915.

October, 1915—La dette viagère au 1er janvier 1914. Le commerce extérieur de la France en 1913, en 1914 et pendant les huit premiers mois de 1915. Les revenus de l'État. Bulgarie: La dette publique au 31 décembre 1913. Bulgarie: Les revenus de 1906 à 1913.

Journal des Économistes—

July, 1915—Les Dépenses et les Ressources de la France et Royaume-Uni: *Guyot (Yves).* La Guerre et l'Industrie allemande en 1914–15: *Raffalovich (A.).* La Proposition Connevot et les marchés de fourniture de l'État: *D. B.* L'Industrie des matières colorantes en Allemagne et ailleurs: *Bellet (Daniel).* La Crise houillère en Espagne: *Meriel (Pierre de).* Les Fournitures de guerre aux États-Unis: *A. R.*

August, 1915—Les Problèmes économiques après la guerre: *Guyot (Yves).* La Guerre et l'Industrie allemande en 1914–15: *Raffalovich (A.).* Les Banques françaises pendant la guerre: *Levy (R. G.).* Les Finances espagnoles et l'échec du récent emprunt: *Meriel (P. de).* Les Echanges d'or et les chiffres de douanes: *Goury (L.)*

September, 1915—Les Problèmes économiques après la paix: *Guyot (Yves).* La Loi sur les pensions civiles: *Gueroult (G.).* Les Valeurs mobilières étrangères et le Fisc: *Falck (E.).* Les Progrès sur les chemins de fer français: *Pawlowski (A.).* Le Marché sucrier américain et la Guerre de 1914: *Dureau (G.).* Les Caisses d'épargne et la Guerre: *Nouvion (G. de).*

October, 1915—Le Budget britannique: *Guyot (Yves).* L'Industrie er le Crédit en Italie: *Lemonon (E.).* Le Bassin houiller de la Sarre: *Goury (L.).* Influence de la conservation frigorifique des denrées périssables sur le prix de la vie aux Etats-Unis: *Gouault (E.).* L'Industrie lainière en Espagne: *Meriel (P. de).* La Marine marchande espagnole: *Meriel (P. de).* Le Budget de la République Argentine pour 1916: *Meriel (P. de).*

November, 1915—Le crédit britannique et la guerre: *Guyot (Yves).* La Théorie de la productivité finale et le profit: *Bellom (M.).* Ce que donne le Canal de Panama: *Bellet (Daniel).* L'Extension du commerce d'exportation français et les Chambres de commerce: *Nouvion (G. de).* L'Industrie

FRANCE—*Contd.*

Journal des Économistes—Contd.

vinicole en Espagne: *Mériel* (*P. de*). L'Exploitation des téléphones en Espagne: *Mériel* (*P. de*). Les Chemins de fer américains de 1904–14: *Gouvy* (*L.*). Comment atteindre les centres commerciaux du Brésil: *Bougeois* (*H.*). La Situation financière du Pérou: *Bougeois* (*H.*). Le Commerce de la laine en Uruguay: *Bougeois* (*H.*).

December, 1915—La Question bulgare: *Guyot* (*Yves*). La Potasse en Haute Alsace: *Gouvy* (*L.*). L'Emprunt 5 per cent. de la victoire: *Barriol* (*A.*). Note sur la petite monnaie: *Barriol* (*A.*). En Espagne: Les projets budgetaires. Les nouveaux Impôts proposés: *Mériel* (*Pierre de*). La République Argentine. I. Sa colonisation. II. Projet de loi sur l'immigration.

Journal de la Société de Statistique de Paris—

August–September, 1915—La statistique internationale des valeurs mobilières: *Neymarck* (*A.*). La valeur immobilière du territoire français encore envahi au 15 novembre 1914 (Fortune privée): *Michel* (*Ed.*).

October, 1915—La statistique de la défense nationale: *Bellom* (*Maurice*). La statistique internationale des valeurs mobilières: *Neymarck* (*Alfred*). Chronique des Questions ouvrières et des assurances sur la vie: *Bellom* (*Maurice*).

November, 1915—Démographie de guerre.—Mobilisation matrimoniale: *Cherrin* (*M. le Dr.*). Aperçu des difficultés inhérentes à la Statistique de certains métaux: *Dubern Boislandry* (*M. E.*).

December, 1915—L'esprit statistique et la guerre: *Bellom* (*Maurice*). La valeur sociale des individus au point de vue économique: *d'Eichthal* (*Eug.*).

Revue d'Économie Politique. July–August, 1915—La Serbie.—Son Passé. Son Avenir: *Bellet* (*Daniel*). Essai sur la conception de l'histoire et du progrès d'après Proudhon: *Turgeon* (*Charles*). Plans d'aménagement des villes et les cités-jardins: *Benoit-Levy* (*Georges*).

Revue des Sciences Politiques—

August, 1915—Après douze mois de guerre. Coup d'œil sur la situation économique en France: *d'Eichthal* (*Eugène*). La réforme bancaire aux Etats-Unis. Le "Federal Reserve Act" du 23 Décembre 1913: *Viallate* (*A.*). Le commerce allemand et les raisons de son développement: *Bellet* (*Daniel*).

October, 1915—L'effort britannique pour la guerre pendant les huit premiers mois (août 1914–avril 1915): *Desarrin* (*Maurice*). L'exploitation du domaine industriel et agricole de la Prusse: *Schehler* (*Henri*).

December, 1915—L'avenir du Droit international: *Dupuis* (*Charles*). Les opérations de la guerre en 1914. I. Les débuts de la guerre. Le plan allemand: *Malleterre* (*Général*). La presse allemande pendant la première année de guerre: *V. H. F.* La reorganisation de l'administration des villes du Maroc par le protectorat: *Holtz* (*L.*). La Russie pendant la guerre: *Lauwick* (*M.*).

ITALY—

Giornale degli Economisti e Rivista di Statistica—

October, 1915—L'applicazione dei procedimenti matematici alle scienze sociale nel momento attuale: *Murray* (*R. A.*). L'esportazione del frumento dall' Australia: *Garibaldi* (*A.*). Achille Necco (Necrologio): *Ricci* (*U.*).

November, 1915—Lineamenti generali della teoria dell' interesse: *Vecchio* (*G. del*). (*Continued in next issue.*) La politica commerciale italiana e i suoi effetti sull' economia nazionale: *Fraschetti* (*A.*). Per una teoria dell' Urbanismo: *Vinci* (*F.*). Un caso concreto di collettivismo: *Curato* (*G.*).

December, 1915—Problemi finanziari della guerra: *Cabiati* (*Attilio*). Il commercio dell' Italia coll' estero nel periodo della sua neutralita: *Bruccoleri* (*Giuseppe*).

La Riforma Sociale. November-December, 1915—Le relazioni della economia politica con la guerra: *Edgeworth* (*F. Y.*). L'economia britannica in tempo di guerra: *Scott* (*W. R.*). Civilta latina e civilta germanica: *Patetta* (*Federico*). La coscrizione e l'Inghilterra: *Porri* (*V.*). Perequazione fondiaria e catastazione provvisoria: *Giordano* (*L.*). I profitti di guerra e l'imposta di ricchezza mobile: *Crimi* (*Gaetano*).

Rivista Italiana di Sociologia—

May-August, 1915—Il debito e la sua responsabilità: *Schupfer* (*F.*). Le forze numeriche e il valore sociale della cultura classica e della tecnica: *Niceforo* (*A.*). La teoria della variabilità nelle serie statistiche: *Pietra* (*G.*).

September-December, 1915—Fattori ed effetti sociologici della guerra: *Catellani* (*E.*). La diseguaglianza delle razze umane: *Puini* (*C.*). Nuove indagini di psichiatria e sociologia criminale: *Consiglio* (*P.*).

LIST OF ADDITIONS TO THE LIBRARY.

During the period that has elapsed since July, 1915, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Chile—

Wheat. Importacion, exportacion y consumo de Trigo en Chile, en los ultimos 20 anos. 6 pp., sm. 8vo. 1915. (The Central Statistical Office.)

Denmark—

Housing. Conditions d'habitation et de location dans les villes de province du Danemark en 1911. 4to. 1915. (The State Statistical Department.)

Italy—

Dati statistici sui rimpatriati per causa di guerra e sulla disoccupazione. Fol. 1915. (The Ministry of Agriculture.)

Japan—

Diagrams and numerical tables showing growth of population and vital statistics of the Japanese Empire. (Exhibits at Panama-Pacific International Exposition. March, 1915.) 8vo. 1915. (The Statistical Bureau.)

Netherlands—

Army. Statistisch overzicht der behandelde zieken van het Nederlandsch-Indisch Leger, 1912. 8vo. 1915. (The Central Statistical Bureau.)

Norway—

Budgets de familles d'employés du commerce, etc. 44 pp., 8vo. 1915. (The Central Statistical Bureau.)

Christiania—

Housing. Conditions d'habitation dans les petits logements de Kristiania. en 1913/1914. 49 pp., 8vo. 1915. (Municipal Statistical Bureau.)

Prices. Nogen oplysninger om de senere aars prisbevægelse paa livsfornodenheter i Kristiania. 14 pp., 8vo. 1915. (*Id.*)

Portugal—

Census. Recensement de la population de Portugal au 1er Décembre 1911. Part 2. Population de fait d'après les âges, en distinguant le sexe, l'état civil et l'instruction. Tableaux comparatifs. Part 3. Aveugles, sourd-muets, idiots et aliénés d'après les sexes. Part 4. Longévité. Individus âgés de 80 ans et plus, groupés d'après les âges, en distinguant le sexe. 2 vols., 8vo. 1914. (The Director of Statistics.)

Russia—

Russian Year-Book for 1915. Compiled and edited by N. Peacock. viii + 623 pp., 8vo. London, 1915. (Eyre and Spottiswoode.)

Finland—

Alcohol. Commerce des boissons alcooliques et sociétés de vente et de débit des alcools en Finlande, 1903-1910. 8vo. 1913. (The Central Statistical Bureau.)

Census. Population de Finlande au 31 Décembre, 1910. Selon les registres ecclésiastiques. Tome 1. Nombre de la population. Répartition par sexe l'âge, l'état civil, la langue, la confession, le degré d'instruction, le lieu de naissance ainsi que le domicile de la population absente. 321 pp., 8vo. 1915. (The Central Bureau of Statistics of Finland.)

—— Recensement de la Population de différentes villes, etc., au 7 Décembre, 1910. 8 parts, 8vo. 1914. (*Id.*)

(a) **Foreign Countries**—*Contd.*

Spain—

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Wells (*S. Russell*), B.Sc. Germany's food—can it last? The German case as presented by German experts. With a critical introduction by A. D. Waller, M.D., LL.D., F.R.S. xxxi + 232 pp., 8vo. 1915. (Purchased.)

Wereide (*Dr. Thorstein*). Statistical theory of energy and matter. xv + 169 pp., 8vo. Christiania, 1915. (Gyldendalske Boghandel, Nordisk Forlag.)

Wood (*T. B.*) and *Hopkins* (*F. G.*). Food Economy in War Time. 35 pp., 8vo. Cambridge, 1915. (The University Press.)

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British Association. Section F. Manchester, 1915. Address to Economic science and statistics section by Professor W. R. Scott, M.A. 9 pp., 8vo. 1915. (The Association).

—— Draft interim report of conference to investigate into outlets for labour after the war. 82 pp., 8vo. 1915. (*Id.*)

—— Effects of the war on credit, currency and finance. 34 pp., 8vo. 1915. (*Id.*)

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Carnegie United Kingdom Trust. 1st. Annual report for 1914 by the Executive Committee to the Trustees, 1915. (2) Report on library provision and policy, by Professor W. G. S. Adams to the Trustees. 2 parts. 8vo. 1915. (The Trust.)

(e) **Societies, &c. (British), and Miscellaneous**—*Contd.*

Commission for Relief in Belgium. Belgian section. Report covering period of about eight months, from the inception to June 30th, 1915. (2) Northern France section. Report covering period of three months to June 30th, 1915. 2 reports. Fol. 1915. (The Commission.)

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SHIPPING.—(United Kingdom.)—*Account of Tonnage of Vessels Entered and Cleared with Cargoes, from and to Various Countries, during the* Years *ended Dec.*, 1915-14-13.

Countries from whence Entered and to which Cleared.	Total British and Foreign.					
	1915.		1914.		1913.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
FOREIGN COUNTRIES.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Russia Northern ports	591,094	240,792	1,890,684	1,803,274	3,315,243	3,296,217
Russia Southern ,, ...	—	—	424,808	180,433	566,534	327,945
Russia Pacific ,, ...	91,316	59,284	55,468	60,838	61,921	36,752
Sweden	1,502,431	1,590,737	1,479,619	2,445,700	1,689,478	2,697,701
Norway	1,698,989	1,954,179	1,344,789	1,788,900	1,371,121	1,634,775
Denmark	413,599	1,985,336	521,488	2,027,735	547,586	2,047,124
Germany	2,039	—	1,534,236	3,317,554	2,537,581	5,810,076
Netherlands	1,314,283	1,971,484	2,828,612	3,010,230	3,164,717	3,502,973
Belgium	—	60	2,004,969	1,907,188	3,088,602	3,029,705
France	2,403,887	10,676,412	3,689,283	8,338,671	4,056,554	8,627,450
Spain	2,853,993	1,476,255	2,615,793	1,885,294	3,134,540	2,220,784
Portugal	316,009	571,244	279,923	645,770	296,763	778,013
Italy	295,463	3,095,685	411,104	4,265,528	398,334	4,838,100
Austria-Hungary	—	—	70,822	330,107	128,758	619,794
Greece	131,237	221,108	143,519	307,416	118,750	361,196
Turkey	46,663	47,468	124,986	296,123	179,710	285,998
Roumania	—	—	244,033	181,099	163,328	207,723
Egypt	*	*	314,645	1,383,031	310,953	1,723,311
Algeria	432,931	519,615	422,522	497,663	465,358	687,341
Portuguese East Africa	108,086	169,640	246,935	263,111	293,504	398,230
United States of America	7,843,543	3,894,909	8,061,467	6,222,598	8,663,347	6,837,703
Mexico, Foreign W. Indies, and Central America	535,947	300,664	556,883	474,216	548,155	642,964
Colombia	133,213	18,692	99,690	40,276	142,379	42,855
Brazil	167,275	464,469	311,098	897,063	259,894	1,422,773
Peru	145,959	108,605	227,829	185,597	228,662	274,729
Chile	245,996	87,688	168,511	369,655	158,278	488,090
Uruguay	18,709	172,965	36,188	290,748	64,911	458,578
Argentine Republic	2,546,564	1,927,303	2,234,655	2,923,418	2,590,918	3,713,570
China	91,140	40,835	72,233	78,650	64,190	154,389
Java	306,307	292,305	361,817	318,927	88,620	316,754
Japan	538,580	531,002	525,827	668,838	508,174	752,735
Other countries	742,204	706,246	845,719	724,539	901,518	850,226
Total, Foreign Countries.	25,517,457	33,124,982	34,150,155	48,130,190	40,108,381	59,086,574
BRITISH POSSESSIONS.						
British North America	2,303,161	1,358,082	3,088,398	2,119,639	3,090,915	2,489,766
British India	2,056,123	1,205,605	1,903,799	1,620,087	2,235,385	1,811,874
Mauritius, Ceylon, Straits Settlements, & Hong Kong	186,960	133,396	161,631	294,407	122,518	383,551
Australia	1,113,230	884,647	1,454,359	1,174,963	1,358,829	1,174,471
New Zealand	407,714	329,914	421,716	428,794	410,895	486,526
West Indies	164,338	60,117	214,731	108,980	186,660	109,956
Channel Islands	369,541	348,494	520,430	419,047	494,063	355,056
Gibraltar and Malta	73,412	251,319	76,437	315,987	92,130	498,132
Egypt	504,579	843,113	*See under* "Foreign Countries."			
Union of South Africa	389,642	441,024	423,153	698,033	419,076	759,101
Other possessions	639,560	548,669	645,974	658,442	545,381	664,694
Total, British Possessions	8,208,260	6,404,380	8,910,628	7,838,379	8,955,852	8,733,127
TOTAL FOREIGN COUNTRIES AND BRITISH POSSESSIONS.						
Twelve Months ended December, 1915	33,725,717	39,529,362	—	—	—	—
Twelve Months ended December, '14	—	—	43,060,783	55,968,569	—	—
Twelve Months ended December, '13	—	—	—	—	49,064,233	67,819,701

* *See under* "British Possessions."

Values of **Imports** *into the United Kingdom for the Years* **1913-14-15.***

[From the Monthly Trade Returns, December, 1915.]

	Year ended December 31,			Increase (+) or Decrease(−) in 1915 as Compared with 1914.	Increase (+) or Decrease(−) in 1915 as Compared with 1913.
	1913.	1914.	1915.		
I. FOOD, DRINK, AND TOBACCO—	£	£	£	£	£
A. Grain and flour	85,494,628	79,636,269	112,362,691	+32,726,422	+26,868,063
B. Meat, including animals for food	56,726,411	63,215,056	86,951,345	+23,736,289	+30,224,934
C. Other food and drink—					
(1.) Non-dutiable	81,265,355	78,611,719	91,489,864	+12,878,145	+10,224,509
(2.) Dutiable	58,683,367	68,043,095	82,452,403	+14,409,308	+23,769,036
D. Tobacco	8,032,562	7,463,068	8,644,598	+ 1,181,530	+ 612,036
Total, Class I	290,202,323	296,969,207	381,900,901	+84,931,694	+91,698,578
II. RAW MATERIALS AND ARTICLES MAINLY UNMANUFACTURED—					
A. Coal, coke, and manufactured fuel	36,700	41,924	10,733	− 31,191	− 25,967
B. Iron ore, scrap iron, and steel	7,433,219	5,487,344	7,564,597	+ 2,077,253	+ 131,378
C. Other metallic ores	10,197,330	9,533,465	11,605,277	+ 2,071,812	+ 1,407,947
D. Wood and timber	33,788,884	25,343,111	32,778,764	+ 7,435,653	− 1,010,120
E. Cotton	70,570,547	55,350,626	64,672,649	+ 9,322,023	− 5,897,898
F. Wool	37,736,434	34,246,722	44,149,007	+ 9,902,285	+ 6,412,573
G. Other textile materials	19,751,135	15,367,670	21,029,311	+ 5,661,641	+ 1,278,176
H. Oil seeds, nuts, oils, fats, and gums	41,576,680	41,332,056	49,748,729	+ 8,416,673	+ 8,172,049
I. Hides and undressed skins	15,067,176	12,727,066	13,964,295	+ 1,237,229	− 1,102,881
J. Paper-making materials	5,815,863	5,958,215	6,152,351	+ 194,136	+ 336,548
K. Miscellaneous	39,848,536	31,143,184	35,665,813	+ 4,522,629	− 4,182,723
Total, Class II.	281,822,444	236,531,383	287,341,526	+50,810,143	+ 5,519,082
III. ARTICLES WHOLLY OR MAINLY MANUFACTURED—					
A. Iron and steel and manufactures thereof	15,231,633	0,877,249	10,839,071	− 38,178	− 4,392,562
B. Other metals and manufactures thereof	32,102,226	29,604,332	42,214,990	+12,610,658	+10,112,764
C. Cutlery, hardware, implements (except machine tools), and instruments	7,378,360	5,194,203	4,930,504	− 263,699	− 2,447,856
D. Electrical goods and apparatus (other than machinery and uninsulated wire)	1,587,294	1,242,770	1,096,234	− 146,536	− 491,060
E. Machinery	7,282,971	6,712,499	8,847,844	+ 2,135,345	+ 1,564,873
F. Ships (new)	34,164	31,930	157,256	+ 125,326	+ 123,092
G. Manufactures of wood and timber (including furniture)	3,583,187	2,336,918	2,324,627	− 12,291	− 1,258,560
H. Yarns and textile fabrics—					
(1.) Cotton	12,249,846	9,373,309	7,555,810	− 1,817,499	− 4,694,036
(2.) Wool	10,490,446	7,648,409	1,724,575	− 5,923,834	− 8,765,871
(3.) Silk	15,115,381	13,392,844	14,637,953	+ 1,245,109	− 477,428
(4.) Other materials	9,129,183	7,353,124	9,042,702	+ 1,689,578	− 86,481
I. Apparel	5,979,673	4,252,750	2,956,150	− 1,296,600	− 3,023,523
J. Chemicals, drugs, dyes, and colours	12,905,515	12,064,430	19,343,951	+ 7,279,521	+ 6,438,436
K. Leather and manufactures thereof (including gloves, but excluding boots and shoes)	13,430,762	13,478,148	17,044,396	+ 3,566,248	+ 3,613,634
L. Earthenware and glass	4,546,267	2,994,307	2,170,261	− 824,046	− 2,376,006
M. Paper	7,674,419	6,791,191	6,648,665	− 142,526	− 1,025,754
N. Railway carriages and trucks (not of iron), motor cars, cycles, carts, &c.	8,357,424	7,266,894	9,155,752	+ 1,888,858	+ 798,328
O. Miscellaneous	26,523,624	19,874,909	20,824,101	+ 949,192	− 5,699,523
Total, Class III	193,602,375	160,490,216	181,514,842	+21,024,626	−12,087,533
IV. MISCELLANEOUS AND UNCLASSIFIED (including parcel post)	3,107,597	2,644,307	2,999,010	+ 345·703	− 108,587
Total	768,734,739	696,635,113	853,756,279	+157,121,166	+85,021,540

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* The values of the imports represent the cost, insurance, and freight; or, when goods are consigned for sale, the latest sale value of such goods.

Values of Exports *of British and Irish Produce and Manufactures for the Years* 1913-14-15.*

[From the Monthly Trade Returns, December, 1915.]

	Year ended December 31,			Increase (+) or Decrease (−) in 1915 as Compared with 1914.	Increase (+) or Decrease (−) in 1915 as Compared with 1913.
	1913.	1914.	1915.		
I. FOOD, DRINK, AND TOBACCO—	£	£	£	£	£
A. Grain and flour	3,561,831	3,095,080	3,785,052	+ 689,972	+ 223,221
B. Meat, including animals for food	1,238,907	1,139,362	1,344,071	+ 204,709	+ 105,164
C. Other food and drink	24,410,732	19,006,084	16,075,600	− 2,930,484	− 8,335,132
D. Tobacco	3,376,472	3,708,016	3,791,363	+ 83,347	+ 414,891
Total, Class I.	32,587,942	26,948,542	24,996,085	− 1,952,456	− 7,591,856
II. RAW MATERIALS AND ARTICLES MAINLY UNMANUFACTURED—					
A. Coal, coke, and manufactured fuel	53,659,660	42,202,128	38,823,606	− 3,378,522	−14,836,054
B. Iron ore, scrap iron, and steel	410,570	298,196	197,070	− 101,126	− 213,500
C. Other metallic ores	130,283	109,745	26,964	− 82,781	− 103,319
D. Wood and timber	340,745	277,328	198,322	− 79,006	− 142,423
E. Cotton	...	...	...	...	...
F. Wool	4,623,468	4,469,090	3,846,443	− 622,647	− 777,025
G. Other textile materials	434,420	417,723	450,185	+ 32,462	+ 15,765
H. Oil seeds, nuts, oils, fats, and gums	4,468,104	3,962,292	5,387,647	+ 1,425,355	+ 919,543
I. Hides and undressed skins	1,886,305	1,483,108	899,150	− 583,958	− 987,155
J. Paper-making materials	958,435	845,057	668,759	− 176,298	− 289,676
K. Miscellaneous	2,993,002	2,648,415	1,856,844	− 791,571	− 1,136,158
Total, Class II.	69,904,992	56,713,082	52,354,990	− 4,358,092	−17,550,002
III. ARTICLES WHOLLY OR MAINLY MANUFACTURED—					
A. Iron and steel and manufactures thereof	54,291,768	41,667,830	40,421,958	− 1,245,872	−13,869,810
B. Other metals and manufactures thereof	13,279,060	10,283,283	9,697,766	− 585,517	− 3.581,294
C. Cutlery, hardware, implements (except machine tools), and instruments	7,972,380	6,512,218	5,066'119	− 1,446,099	− 2,906.261
D. Electrical goods and apparatus (other than machinery and uninsulated wire)	5,386,273	3,018,600	3,180,809	+ 162,209	− 2,205,464
E. Machinery	37,012,635	31,363,093	19,192,153	−12,170,940	−17,820,482
F. Ships (new)	11,026,530	6,932,554	1,687,055	− 5,245,499	− 9,339,475
G. Manufactures of wood and timber (including furniture)	2,041,640	1,564,388	1,041,775	− 522,613	− 999,865
H. Yarns and textile fabrics—					
(1.) Cotton	127,161,838	103,266,538	85,925,992	−17,340,546	−41,235,846
(2.) Wool	37,676,687	31,499,885	32,888,487	+ 1,388,602	− 4,788,200
(3.) Silks	2,157,530	1,865,573	1,698,367	− 167,206	− 459,163
(4.) Other materials	14,827,973	12,982,261	11.716,517	− 1,265,744	− 3,111,456
I. Apparel	16,424,329	14,531,674	11,509,091	− 3,022,583	− 4,915,238
J. Chemicals, drugs, dyes, and colours	21,974,386	19,508,061	22,059,580	+ 2,551,519	+ 85,194
K. Leather and manufactures thereof (including gloves, but excluding boots and shoes)	5,648,276	4,685,015	3,796,485	− 888,530	− 1,851,791
L. Earthenware and glass	5,213,221	4,147,640	3,296,850	− 850,790	− 1,916,371
M. Paper	3,679,195	3,185,939	2,997,053	− 188,886	− 682,142
N. Railway carriages and trucks (not of iron), motor cars, cycles, carts, &c.	11,365,888	11,229,558	6,585,749	− 4,643,809	− 4,780,139
O. Miscellaneous	34,228,749	30,389,451	30,026,110	− 363,314	− 4,202,639
Total, Class III.	411,368,358	338,633,564	292.787,916	−45,845,648	−118,580,442
IV. MISCELLANEOUS AND UNCLASSIFIED (including parcel post)	11,383,997	8,426,169	14,508,344	+ 6,082,175	+ 3,124,347
Total	525,245,289	430,721,357	384,647.336	−46,074,021	−140,597,953

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* The values of the exports represent the cost and the charges of delivering the goods on board the ship, and are known as the "free on board" values.

BANK OF ENGLAND.

Pursuant to the Act 7th and 8th Victoria, cap. 32 (1844),

[0,000's omitted.]

1	2	3	4	5	6	7
Issue Department.					Collateral Columns.	
Liabilities.	Dates. (Wednesdays.)	Assets.			Notes in Hands of Public. (Col. 1 minus col. 16.)	Minimum Rates of Discount at Bank of England.
Notes Issued.		Government Debt.	Other Securities.	Gold Coin and Bullion.		
£ Mlns.	1915.	£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.	Per cent.
86,72	Jan. 6	11,02	7,43	68,27	35,88	5
87,16	,, 13	11,02	7,43	68,71	35,17	
87,59	,, 20	11,02	7,43	69,14	34,77	
86,80	,, 27	11,02	7,43	68,35	34,70	
84,97	Feb. 3	11,02	7,43	66,52	34,83	
84,45	,, 10	11,02	7,43	66,00	34,42	
82,61	,, 17	11,02	7,43	64,16	34,17	
80,78	,, 24	11,02	7,43	62,33	34,22	
76,97	Mar. 3	11,02	7,43	58,52	34,53	
76,83	,, 10	11,02	7,43	58,38	34,30	
76,48	,, 17	11,02	7,43	58,03	32,62	
74,14	,, 24	11,02	7,43	55,69	34,17	
70,90	,, 31	11,02	7,43	52,45	35,17	
70,76	April 7	11,02	7,43	52,31	34,94	
72,37	,, 14	11,02	7,43	53,92	34,59	
72,70	,, 21	11,02	7,43	54,25	34,33	
72,51	,, 28	11,02	7,43	54,06	34,69	
73,39	May 5	11,02	7,43	54,94	34,94	
80,79	,, 12	11,02	7,43	62,34	35,00	
78,86	,, 19	11,02	7,43	60,41	34,00	
78,87	,, 26	11,02	7,43	60,42	32,95	
75,90	June 2	11,02	7,43	57,45	33,53	
76,66	,, 9	11,02	7,43	58,21	33,15	
74,84	,, 16	11,02	7,43	55,39	32,95	
71,47	,, 23	11,02	7,43	53,02	33,13	
69,53	,, 30	11,02	7,43	51,08	34,64	
70,68	July 7	11,02	7,43	52,23	35,07	
70,58	,, 14	11,02	7,43	52,13	34,49	
76,91	,, 21	11,02	7,43	58,46	33,77	
78,39	,, 28	11,02	7,43	59,94	33,53	
79,67	Aug. 4	11,02	7,43	61,21	33,49	
83,23	,, 11	11,02	7,43	64,78	32,46	
84,63	,, 18	11,02	7,43	66,18	31,96	
84,84	,, 25	11,02	7,43	66,39	31,80	
85,92	Sept. 1	11,02	7,43	67,47	32,32	
85,20	,, 8	11,02	7,43	66,75	31,79	
81,75	,, 15	11,02	7,43	63,30	31,52	
80,99	,, 22	11,02	7,43	62,90	31,62	
80,27	,, 29	11,02	7,43	61,51	32,80	
79,52	Oct. 6	11,02	7,43	61,25	32,88	
78,25	,, 13	11,02	7,43	59,80	32,56	
77,18	,, 20	11,02	7,43	58,73	32,57	
74,52	,, 27	11,02	7,43	56,07	32,79	
74,94	Nov. 3	11,02	7,43	56,50	33,43	
73,64	,, 10	11,02	7,43	55,19	33,20	
71,86	,, 17	11,02	7,43	53,41	33,01	
70,74	,, 24	11,02	7,43	52,30	33,31	
69,55	Dec. 1	11,02	7,43	51,10	34,27	
68,59	,, 8	11,02	7,43	50,14	34,16	
68,60	,, 15	11,02	7,43	50,15	34,27	
69,36	,, 22	11,02	7,43	50,91	35,40	
69,79	,, 29	11,02	7,43	51,34	35,31	

—WEEKLY RETURN.

for Wednesday in each Week, during the Year **1915.**

[0,000's omitted.]

8	9	10	11	12	13	14	15	16	17	18
BANKING DEPARTMENT.										
Liabilities.					DATES. (Wednesdays.)	Assets.				Totals of Liabilities and Assets.
Capital and Rest.		Deposits.		Seven Day and other Bills.		Securities.		Reserve.		
Capital.	Rest.	Public.	Private.			Government.	Other.	Notes.	Gold and Silver Coin.	
£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.	1915.	£ Mlns.	£ Mlns	£ Mlns.	£ Mlns.	£ Mlns.
14,55	3,42	23,81	133,35	,2	Jan. 6	14,81	108,92	50,84	,58	175,15
14,55	3,45	44,83	116,06	,3	„ 13	18,07	108,22	51,98	,66	178,93
14,55	3,48	37,59	126,28	,3	„ 20	18,07	110,26	52,82	,78	181,94
14,55	3,50	47,39	117,59	,3	„ 27	21,32	108,84	52,10	,81	183,07
14,55	3,55	38,61	123,94	,4	Feb. 3	21,32	108,09	50,14	1,13	180,68
14,55	3,57	46,45	115,83	,3	„ 10	24,58	104,62	50,04	1,20	180,43
14,55	3,57	40,32	117,62	,3	„ 17	24,56	101,70	48,45	1,38	176,09
14,55	3,57	26,92	132,87	,4	„ 24	26,92	102,93	46,56	1,54	177,95
14,55	3,69	51,87	118,84	,5	Mar. 3	26,92	118,17	42,43	1,48	189,00
14,55	3,69	50,13	129,76	,4	„ 10	27,14	127,01	42,53	1,49	198,18
14,55	3,70	70,95	100,40	,4	„ 17	30,05	115.75	42,41	1,44	189,65
14,55	3,76	92,05	93,08	,4	„ 24	35,35	126,60	39,98	1,56	203,48
14,55	3,75	113,69	89,71	,5	„ 31	44,61	140,00	35,73	1,45	221,75
14,55	3,11	105,27	97,65	,5	April 7	44,61	138,76	35,82	1,44	220,63
14,55	3,12	104,16	102,97	,5	„ 14	47,86	137,81	37,78	1,39	224,85
14,55	3,12	125,41	88,75	,5	„ 21	47,81	144,32	38,37	1,39	231,89
14,55	3,13	132,07	87,03	,5	„ 28	51,06	146,69	37,83	1,25	236,84
14,55	3,11	134,17	85,13	,5	May 5	51,04	146,15	38,44	1,37	237,01
14,55	3,12	127,86	95,61	,4	„ 12	51,04	143,07	45,79	1,29	241,19
14,55	3,12	130,38	94,62	,5	„ 19	51,04	145,53	44,86	1,30	242,73
14,55	3,14	132,09	87,74	,5	„ 26	51,04	139,29	45,92	1,32	237,57
14,55	3,11	131,75	84,03	,5	June 2	51,04	138,88	42,37	1,19	233,50
14,55	3,16	123,34	91,44	,5	„ 9	51,04	136,82	43,50	1,18	232,54
14,55	3,16	113,04	101,76	,5	„ 16	51,04	139,49	40,89	1,14	232,57
14,55	3,17	99,58	109,56	,5	„ 23	51,04	136,39	38,34	1,14	226,91
14,55	3,09	81,51	140,65	,5	„ 30	51,04	152,91	34,89	1,01	239,86
14,55	3,24	67,90	139,86	,5	July 7	51,04	137,92	35,60	1,04	225,60
14,55	3,27	52,99	157,98	,5	„ 14	51,75	140,02	36,09	,99	228,85
14,55	3,38	109,23	134,62	,5	„ 21	53,16	164,57	43,14	,97	261,83
14,55	3,40	177,64	95,54	,4	„ 28	53,16	192,20	44,86	,97	291,18
14,55	3,45	147,06	84,22	,4	Aug. 4	46,87	155,26	46,17	1,02	249,32
14,55	3,50	142,60	85,08	,4	„ 11	45,92	148,14	50,76	,96	245,76
14,55	3,53	102,66	124,64	,3	„ 18	45,62	146,18	52,67	,95	245,42
14,55	3,64	134,05	89,47	,3	„ 25	45,66	142,14	53,04	,91	241,74
14,55	3,64	137,94	87,92	,4	Sept. 1	44,42	145,11	53,59	,97	244,08
14,55	3,67	129,59	85,94	,3	„ 8	34,42	145,23	53,41	,73	233,79
14,55	3,72	121,57	90,17	,3	„ 15	34,42	144,95	50,23	,44	230,05
14,55	3,76	108,74	89,64	,2	„ 22	31,31	135,68	49,37	,36	216,72
14,55	3,78	116,22	76,69	,2	„ 29	31,29	132,31	47,47	,19	211,26
14,55	3,12	81,38	98,30	,2	Oct. 6	31,29	119,27	46,64	,18	197,38
14,55	3,16	70,86	97,91	,3	„ 13	25,96	114,71	45,69	,16	186,51
14,55	3,18	46,13	98,38	,3	„ 20	18,90	98,62	44,61	,15	162,27
14,55	3,21	39,88	99,67	,3	„ 27	18,90	96,57	41,73	,16	157,35
14,55	3,21	45,54	95,74	,3	Nov. 3	18,90	98,54	41,52	,16	159,11
14,55	3,22	48,96	90,42	,2	„ 10	18,90	97,67	40,44	,16	157,17
14,55	3,24	50,18	91,68	,2	„ 17	18,90	101,76	38,85	,16	159,66
14,55	3,25	52,15	84,65	,1	„ 24	18,90	98,12	37,44	,16	154,62
14,55	3,28	50,36	93,53	,1	Dec. 1	18,84	96,48	35,27	,14	161,73
14,55	3,29	52,44	90,02	,1	„ 8	18,84	92,91	34,43	,14	160,32
14,55	3,30	52,14	94,17	,1	„ 15	18,84	96,87	34,33	,13	164,17
14,55	3,29	53,13	98,73	,2	„ 22	18,84	102,46	34,27	,18	169,74
14,55	3,31	49,68	111,98	,2	„ 29	18,84	112,08	34,48	,14	179,53

REVENUE OF THE UNITED KINGDOM.

Net Produce in Quarters in 1915, *and in Financial Years ended March* 31, 1914-15, 1913-14, 1912-13, 1911-12.

[000's omitted.]

QUARTERS, ended	March 31, 1915.	June 30, 1915.	September 30, 1915.	December 31, 1915.	Total for Calendar Year 1915.
	£	£	£	£	£
Customs	11,757,	9,796,	10,967,	17,761,	50,281,
Excise	14,723,	13,374,	14,481,	16,576,	59,154,
Stamps and estate duties	11,363,	10,396,	9,355,	9,053,	40,167,
Taxes (Land Tax and House Duty)	2,270,	310,	30,	30,	2,640,
Post Office	6,510,	3,240,	6,750,	6,380,	22,880,
Telephone Service	1,820,	1,580,	1,500,	1,500,	6,400,
Telegraph Service	670,	780,	750,	620,	2,820,
	49,113,	39,476,	43,833,	51,920,	184,342,
Property and Income Tax	55,855,	10,819,	5,966,	9,110,	81,750,
	104,968,	50,295,	49,799,	61,030,	266,092,
Land value duties	331,	40,	11,	21,	403,
Crown Lands	165,	110,	100,	170,	545,
Interest on Advances	483,	6,	597,	172,	1,258,
Miscellaneous	1,242,	846,	1,062,	2,997,	6,147,
Totals	107,189,	51,297,	51,569,	64,390,	274,445,

YEARS, ended March 31,	1914-15.	1913-14.	1914-15.		Corresponding Years.	
			Less.	More.	1912-13.	1911-12.
	£	£	£	£	£	£
Customs	38,662,	35,450,	—	3,212	33,485,	33,649,
Excise	42,313,	39,590,	—	2,723,	38,000,	38,380,
Stamps and estate duties	35,959,	37,325,	1,366,	—	35,307,	34,846,
Taxes (Land Tax and House Duty)	2,560,	2,700,	140,	—	2,700,	2,880,
Post Office	20,400,	21,190,	790,	—	20,300,	19,650,
Telephone Service	6,250,	6,530,	280,	—	5,775,	2,945,
Telegraph Service	3,000,	3,080,	80,	—	3,100,	3,105,
	149,144,	145,865,	2,656,	5,935,	138,667,	135,455,
Property and Income Tax	69,399,	47,249,*	—	22,150,	44,806,*	44,804,*
	218,543,†	193,114,†	2,656,	28,085,	183,473,	180,259,
Crown Lands	545,	530,	—	15,	530,	530,
Interest on Advances	1,277.	1,580,	303,	—	1,419,	1,281,
Miscellaneous	5,917,	2,304,	—	3,613	2,925,	2,539,
Totals	226,282,	197,528,†	2,959,	31,713,	188,347,†	184,609,†
			NET INC. £28,754,			

* Including Super-Tax. † Excluding Land Value Duties.

GOLD AND SILVER BULLION AND SPECIE.—(United Kingdom.) —*Declared Real Value of*, IMPORTED AND EXPORTED, *for the* Years 1915-14-13.

[000's omitted.]

Countries.	1915.		1914.		1913.	
	Gold.	*Silver.*	Gold.	*Silver.*	Gold.	*Silver.*
Imported from—	£	£	£	£	£	£
Australasia	230,	57,	581,	97,	536,	201,
S. America, Brazil, Mexico, W. Indies	4,652,	37,	9,624,	259,	8,704,	261,
United States	25,	8,304,	7,127,	8,476,	64,	10,714,
	4,907,	8,398,	17,332,	8,832,	9,304,	11,176,
France	4,	101,	311,	72,	979,	189,
Germany, Holland, and Belgium	—	3,	862,	286,	850,	364,
Portugal, Spain, and Gibraltar	41,	63,	172,	85,	150,	19,
Malta and Egypt	631,	25,	3,311,	17,	1,834,	35,
China, with Hong Kong and Japan	24,	422,	7,	451,	—	129,
West Coast of Africa	1,698,	298,	1,752,	386,	1,620,	174,
British Possessions in South Africa	1,479,	—	21,981,	26,	40,795,	4,
British East Indies	1,043,	2,	1,755,	—	2,750,	5,
All other Countries	1,001,	1,248,	11,159,	1,797,	1,252,	2,400,
Totals Imported	10,828,	10,560,	58,642,	11,952,	59,534,	14,495,
Exported to—						
France	1,	1,159,	11,729,	369,	6,268,	572,
Germany, Holland, Belg., and Sweden	2,786,	751,	6,870,	2,302,	10,523,	2,516,
Russia	1,	477,	—	1,200,	2,081,	720,
Portugal, Spain, and Gibraltar	8,123,	47,	1,181,	46,	138,	71,
Malta and Egypt	460,	348,	1,240,	28,	7,815,	48,
	11,371,	2,782,	21,020,	3,945,	26,825,	3,927,
B. India, China, Hong Kong, and Japan	2,552,	3,797,	6,459,	5,712,	10,828,	10,672,
United States	20,983,	1,	3,	37,	713,	3,
South Africa	600,	18,	402,	34,	77,	1,
S. America, Mexico, W. Indies	2,332,	118,	1,469,	356,	4,956,	119,
All other Countries	780,	644,	1,246,	805,	2,688,	1,333,
Totals Exported	38,618,	7,360,	30,599,	10,889,	46,087,	16,055,
Excess of imports	—	3,200,	28,043,	1,063,	13,447,	—
" exports	27,790,	—	—	—	—	1,560,

FOREIGN EXCHANGES.—*Quotations as under,* LONDON *on Paris, Calcutta, and New York and Hong Kong, on* LONDON, *for* **1915.**

1	2	3	4	5	6	7	8
		Calcutta.				Price per Ounce.	
DATES. (Tuesdays or nearest Dates.)	London on Paris. 3 m. d.	London on Calcutta. Demand.	Indian Council Bills. Minimum Price per Rupee.	New York on London. Cable Transfer Sellers.	Hong Kong on London. 4 m. d.*	Gold Bars (Fine).	Standard Silver in Bars.
1915.		*s.* *d.*	*s.* *d.*	$	*s.* *d.*	*s.* *d.*	*s.* *d.*
Jan. 6	25·04	1 $3\frac{15}{16}$	1 $3\frac{15}{16}$	$4{\cdot}84\frac{7}{8}$	1 9	77 9	1 $10\frac{5}{8}$
,, 20	25·10	1 4	1 $3\frac{15}{16}$	$4{\cdot}84\frac{5}{16}$	1 $9\frac{1}{8}$	77 9	1 $10\frac{13}{16}$
Feb. 3	25·11	1 4	1 $3\frac{15}{16}$	$4{\cdot}83\frac{15}{16}$	1 9	77 9	1 $10\frac{5}{8}$
,, 17	$25{\cdot}14\frac{1}{2}$	1 $4\frac{3}{32}$	1 $4\frac{1}{16}$	$4{\cdot}80\frac{1}{4}$	1 $9\frac{1}{8}$	77 9	1 $10\frac{3}{4}$
Mar. 3	25·32	1 $4\frac{1}{16}$	1 4	$4{\cdot}80\frac{5}{8}$	1 $9\frac{1}{4}$	77 9	1 $11\frac{1}{4}$
,, 17	25·34	1 $4\frac{1}{16}$	1 $3\frac{31}{32}$	4·80	1 $9\frac{5}{8}$	77 9	2 $0\frac{1}{8}$
,, 31	$25{\cdot}45\frac{1}{2}$	1 4	1 $3\frac{15}{16}$	$4{\cdot}79\frac{7}{8}$	1 $9\frac{3}{4}$	77 9	1 $11\frac{3}{4}$
Apl. 14	$25{\cdot}52\frac{1}{2}$	1 $4\frac{1}{32}$	—	$4{\cdot}79\frac{11}{16}$	1 $9\frac{3}{4}$	77 9	1 $11\frac{1}{2}$
,, 28	$25{\cdot}51\frac{1}{2}$	1 $4\frac{1}{32}$	1 $3\frac{31}{32}$	$4{\cdot}79\frac{3}{8}$	1 $9\frac{3}{4}$	77 9	1 $11\frac{13}{16}$
May 12	$25{\cdot}56\frac{1}{2}$	1 4	1 $3\frac{15}{16}$	4·80	1 $9\frac{3}{4}$	77 9	1 $11\frac{5}{8}$
,, 26	25·96	1 4	1 $3\frac{15}{16}$	$4{\cdot}78\frac{7}{8}$	1 $9\frac{3}{4}$	77 9	1 $11\frac{5}{8}$
June 9	26·02	1 $3\frac{15}{16}$	1 $3\frac{15}{16}$	$4{\cdot}78\frac{7}{8}$	1 $9\frac{1}{2}$	77 9	1 $11\frac{7}{16}$
,, 23	$26{\cdot}05\frac{1}{2}$	1 $3\frac{31}{32}$	—	$4{\cdot}76\frac{15}{16}$	1 $9\frac{7}{16}$	77 9	1 $11\frac{1}{4}$
July 7	26·85	1 $3\frac{15}{16}$	1 $3\frac{15}{16}$	$4{\cdot}77\frac{7}{16}$	1 $9\frac{7}{8}$	77 9	1 $10\frac{13}{16}$
,, 21	26·45	1 $3\frac{15}{16}$	1 $3\frac{15}{16}$	$4{\cdot}76\frac{15}{16}$	1 9	77 9	1 $10\frac{9}{16}$
Aug. 4	27·14	1 $3\frac{15}{16}$	—	$4{\cdot}76\frac{3}{4}$	1 9	77 9	1 $10\frac{7}{16}$
,, 18	28·05	1 $3\frac{15}{16}$	—	$4{\cdot}65\frac{3}{4}$	1 $9\frac{1}{4}$	77 9	1 $10\frac{13}{16}$
Sept. 1	27·60	1 $4\frac{1}{32}$	—	4·51	1 $9\frac{7}{16}$	77 9	1 11
,, 15	27·80	1 $4\frac{1}{16}$	1 4	$4{\cdot}66\frac{1}{4}$	1 $9\frac{9}{16}$	77 9	1 $10\frac{1}{2}$
,, 29	27·54	1 $4\frac{1}{32}$	1 4	$4{\cdot}71\frac{3}{4}$	1 $9\frac{5}{8}$	77 9	1 $11\frac{5}{8}$
Oct. 13	27·37	1 $4\frac{1}{16}$	1 4	$4{\cdot}67\frac{3}{4}$	1 10	77 9	2 0
,, 27	27·46	1 $4\frac{1}{16}$	1 $4\frac{1}{32}$	$4{\cdot}61\frac{1}{4}$	1 $9\frac{15}{16}$	77 9	1 $11\frac{15}{16}$
Nov. 10	27·75	1 $4\frac{1}{16}$	1 $4\frac{1}{32}$	$4{\cdot}65\frac{3}{4}$	1 $10\frac{1}{8}$	77 9	2 $0\frac{7}{16}$
,, 24	27·82	1 $4\frac{1}{16}$	1 4	$4{\cdot}70\frac{3}{8}$	1 $10\frac{3}{4}$	77 9	2 $1\frac{3}{8}$
Dec. 8	27·67	1 $4\frac{1}{16}$	1 4	$4{\cdot}72\frac{3}{16}$	1 $11\frac{1}{8}$	77 9	2 $2\frac{15}{16}$
,, 22	27·58	1 $4\frac{1}{16}$	1 $4\frac{1}{32}$	$4{\cdot}73\frac{3}{8}$	1 $10\frac{7}{8}$	77 9	2 $2\frac{1}{16}$

* Fridays following.

Vol. LXXIX.] [Part II.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

MARCH, 1916.

The Register of Belgian Refugees.

By T. T. S. de Jastrzebski.

[Read before the Royal Statistical Society, January 18, 1916, the President, The Right Hon. Lord George Hamilton, G.C.S.I., in the Chair.]

The subject of my paper is one which, at the present stage at all events, does not lend itself to advanced statistical treatment. From the writer's point of view this is no disadvantage, for he is as yet a tyro who has to win his spurs in the statistical field. All that he can attempt at present is to treat the matter on general lines, pushing exploration, however, a little further in those directions in which it seems safe so to do.

At the outset it is necessary to clear the ground by describing in some detail the circumstances and manner in which the register has been compiled, so that an idea may be obtained, not only of how the material has been collected but of its reliability.

It was in the latter half of October, 1914, that the President of the Local Government Board requested the Registrar-General to undertake the compilation and maintenance of a Register of Belgian Refugees, with the primary objects of ascertaining their numbers and of enabling the refugees to trace lost relatives and friends. What was involved in the undertaking was a matter of conjecture, and it may be safely said that no one even anticipated its magnitude or the variety and extent of the demands which would be made upon it. One thing, however, was certain—it had to be commenced at once and carried through as rapidly as possible or even more rapidly than that. Material for compilation existed in the shape of records kept by the War Refugees' Committee at Aldwych, by kindred bodies more directly concerned with some special section of the refugees, by the police at Folkestone. On October 23, 1914, a start was made with a hastily recruited temporary staff, officered by two or three members of the permanent staff of the General Register Office. The first task was to make an individual card index, arranged alphabetically, each card to contain the full name and surname, age, sex, occupation, residence in Belgium and address in the United Kingdom. In the light of subsequent experience, it was a mistake to accept the existing records as a basis for compilation. Made by inexperienced persons, in circumstances of unprecedented confusion and hurry, when the information had to be extracted from dazed and bewildered persons of little education, through the medium in many cases of interpreters whose knowledge of one of the two languages employed was extremely limited ; these records abounded in errors and omissions, and their reproduction in the card index involved an altogether disproportionate amount of subsequent labour and trouble in the endeavour to correct them.

As it was evident that these records did not include many refugees who were self-supporting and that many who were receiving private hospitality had not passed through the hands of the War Refugees' Committee, an appeal was made to the local refugee committees and to refugees themselves to register voluntarily on a form drawn up at the General Register Office. Many thousands of these forms were sent out and a large proportion of them returned at varying intervals. As was only to be expected they varied greatly in quality, some being excellently done and others painfully defective. However, they represented a great advance on the original records and as they were received they were compared with the card index, existing cards being corrected where necessary and cards being written in all cases where no record had been made. But even then it was quite apparent that the index was by no means complete. Large numbers of self-supporting refugees were too indifferent to register themselves and there were others who desired for various reasons to avoid registration. At the instance therefore of the Belgian Government, supported by the Registrar-General, the police and the military authorities, the Order in Council making registration compulsory was brought into force in December, 1914. Since that time neglect to register by a Belgian refugee, *i.e.*, by a Belgian arriving in England after the beginning of the war or by an alien resident in Belgium so arriving, has been a punishable offence, and the index has steadily progressed in accuracy and completeness.

One of the obvious defects of the pre-compulsory period was that, although a very considerable proportion of the refugees was registered, there was no proper system by which their movements could be chronicled, a matter vital to the maintenance of the register. Recourse was had to the local committees, to the War Refugees' Committee, to the great camps at the Alexandra Palace and Earl's Court, who were asked to furnish information as to changes of address of refugees. The results were mostly unsatisfactory. Much of the information obtained was inadequate, some inaccurate. When the Order in Council was obtained, one of the first considerations was to bring into being some machinery by which changes of address could be notified to the Central Register. Under the terms of the Order a certificate of registration had to be issued to each refugee over 16 years of age and this certificate has been utilised for recording the change of address. On it instructions are printed in English, French and Flemish, directing the refugee to report any intended change of address at the nearest police station. The date on which and the address to which the refugee concerned is about to remove are noted in a space provided at the foot of the certificate. The instructions further direct the refugee on his arrival at the new address to report himself to the local police to whom the certificate is surrendered and a new one is issued in its place. The surrendered certificate is forwarded to the Central Register. The obligations of the refugee are therefore to report an intended change of address and to report an arrival at a new address to the police. The duties of the police in this connection are (1) on a refugee attending to notify an impending change of address to fill in the particulars of the intended change on the certificate, to make out a form of notification containing full particulars as to the refugee and the intended change and to forward it to the Chief Constable of the district into which the refugee is removing, and (2) on a refugee arriving in the district to impound the existing certificate, enter the particulars as to the refugee in the police register and forward the impounded certificate to the Central Register. It will be seen that each change is automatically reported to the Central Register—that is, if the precise instructions are carried out. Failure to notify change of address is a penal offence. For the Metropolitan Police area, in which the Registrar-General is the sole registration authority, the system is specially modified to meet this fact. In all other parts of England and Wales the Chief Constable is the registration authority for his own district and has to keep a local register of the refugees. It may be added that while the obligation to register and to notify any intended change of address is thrown in the first instance on the refugee, the host in the United Kingdom of any such refugee is also required to see that this obligation is carried out and to supply the required particulars should the refugee fail to do so.

I do not propose to enter in any way into the details of the difficulties, the disappointments and the trials which have been encountered in the compilation and maintenance of the register. Such details would encumber this paper to the exclusion of more important matter and would necessitate the employment of rhetoric too torrid for any scientific assembly. It will be more to the purpose to pass these over in an eloquent silence and to proceed at once to the consideration of what has been done. As already stated, the primary objects of the register were two, first to ascertain numbers and particulars as to the refugees as a whole, secondly to enable the refugees or those interested in them personally to trace missing relatives and friends.

As to the first point the number of individual cards in the principal index up to November 30, 1915, was 225,000 and there were in addition over 8,000 cards on which the information was too scant to admit of their being placed in that index for searching purposes. Among these cards are a number of duplicates, as registration has often been effected more than once by individual refugees, and in a fair number of cases there is a sufficient discrepancy in the names recorded to render identification of the second card made with that already in the index a matter of great uncertainty. On the other hand there is still a number of refugees unregistered and it is reasonably probable that these two errors approximately counterbalance each other. The numbers therefore of the refugees coming to this country up to the end of November last were nearly a quarter of a million. Of these 95 per cent. are Belgians and 5 per cent. of some other alien nationality, mostly Russian Jews. Some 15,000 of Belgian nationality are known to have left the country, independently of those thousands who have joined the Belgian army. Among the non-Belgian refugees the proportion leaving the country is considerably higher, being probably about 20 per cent. This leaves about 200,000 refugees in round figures as in the country at the end of November, 1915. The distribution by age and sex is roughly :—

Infants under 5 years, both sexes	18,500
5 to 15, males	17,000
,, females	16,500
15 to 25, males	19,000
,, females	20,000
25 to 65, males	52,500
,, females	51,000
Over 65, males	2,000
,, females	3,500

The number of males between 15 and 25 here given is undoubtedly in excess of the facts as numbers have joined the army without the fact being communicated to the Central Register.

The refugee population is not a stable one. There is a continuous flow into and out of the United Kingdom and a continuous movement from place to place within the United Kingdom. During the year 1915 the inward and outward flow as shown by the register were as follows :—

Month.	Inward.	Outward.
	Per diem.	Per diem.
January–March	1,000	No data
April–June	300	60
July	200	55
August	150	62
September	110	63
October	50	50
November	100	28

The internal migration was subject to considerable fluctuations in the earlier period covered by the register; for some months, however, it has been a little over one per cent. of the total per week.

As to the second point, the number of searches made in the index since it was declared open in December, 1914, has been about 100,000. These have been made for private individuals, for foreign committees, for the police, for the British and Belgian military authorities, &c. Over 60 per cent. of the searches were made for private persons seeking information as to the whereabouts of missing relatives and friends. At the outset about 15 per cent. of the searches were successful; since last March the proportion of successful has been maintained steadily at double that figure. In all some 15,000 persons have been traced for private applicants. The searches for foreign committees, less numerous in the earlier period, are now considerably in excess of those for private applicants. They constitute about one-third of the first year's total. They come principally from France and the proportion of persons found is considerably lower. This is quite natural as recourse is made to us as a *pis aller*, a last forlorn hope.

On the suggestion of Dr. Stevenson it was decided from the outset to make an additional card index of all refugees who had followed a profession, calling or trade in their own country. This index, on cards of a different colour from the principal index, has been maintained *pari passu* with the latter. It numbers about 87,000 cards, and these are coded according to occupations on the model used in the English Census of 1911. The arrangement of the index is primarily by occupation, secondly by area of residence in the United Kingdom, and thirdly alphabetical. It became apparent, however, that more detailed particulars as to occupation than those recorded on the cards and in the earlier registration forms were necessary for the purposes of employment, and since January last the registration form has contained questions dealing with the occupation followed by the refugee in detail. These forms are arranged in the same way as the index, with a further division into those known to have obtained employment in this country and those not known to be employed. Both the occupational index and the employment forms are corrected in the same way as the principal index.

The Order in Council has no provision for compulsory notification on obtaining employment or of change of occupation or employer, and it is obvious that the particulars obtained as to employment or non-employment in this country are subject to constant change. It was hoped that, in so far at least as the more important occupational groups were concerned, it would be possible to keep the forms fairly accurate through the medium of the Labour Exchange. Experience proved this hope to be fallacious. The proportion obtaining work without the intervention of the Labour Exchange was large, and the particulars furnished of those who did so obtain employment were frequently too meagre to enable individuals concerned to be identified. The only satisfactory method was to send personal inquiries from time to time. Of these inquiries, 44,000 have been sent out. Of 10,000 persons who received these inquiries in August and September last who were not recorded as in employment, over 4,000 reported that they had obtained work, and 2,000 that they were at the moment unemployed. Of the latter 400 gave sickness, age or some other physical disability as the reason, leaving 1,600 employables unemployed. The others did not reply to the inquiry and I think it may fairly be assumed that they were either employed or anxious not to find work. No exact figures can be given as to the proportion of the refugees who have obtained work in this country, but from the various indices available that proportion cannot be less than 70 per cent. and is probably greater. For example, in the trades covered by the inquiry of August and September, it is known that some 13,000 persons have obtained work, as against 2,000 who have not and 4,000 who have not supplied any information. Even assuming that all the latter are unemployed, the percentage known to have obtained employment is 70. A fairer assumption would be that the proportions among the 4,000 unknowns were on a level with the knowns, viz., 13 employed as against 2 unemployed, *i.e.*, that in this important group of trades, covering about one-third of the total, about 85 per cent. have found work here. It is fair to add that this group covers some of the occupations in which one would expect to find a high percentage of workers who would find it easy to obtain employment, including as it does workers in metals and wood, miners and agriculturists. Discounting all this, however, the proportion 70 per cent. seems to me to be below rather than above the facts.

Sufficient data are not to hand to allow of any figures being given as to the numbers who have work outside the occupation which they followed in their own country, a point of considerable interest. The matter has not been overlooked and as far as possible the facts are being collected and may be sufficiently complete at some future date to enable us to draw at least some reasonable deductions.

As an appendix to this paper will be found tables showing the numbers and proportions of persons following certain specified occupations in Belgium according to the census of 1900 and the numbers and proportions of refugees following the same occupations who have arrived in the United Kingdom.

At an early stage it became evident that a complete duplicate index, one that could be sorted in a variety of ways, would sooner or later become necessary. This task was undertaken as soon as the staff was able to undertake it, and duplicate cards are now written in all cases. This duplicate index has been coded according to the areas of residence in this country. As the police district is the registration unit for refugees, this was naturally adopted as the unit for coding, and each card in the duplicate index bears the area code number of the place at which the person resides. On any change of address to a different police area the code number is amended. It is intended at an early date to code it further to the area of residence in Belgium, so that when the question of repatriation arises it will be possible in a few hours to assemble together all cards relating to refugees from any given district, town or village. The code to be used is one for which the writer is directly responsible and a brief description of it may not be without interest. It is quite a simple one—Belgium is divided into nine provinces and in the code the left hand figure indicates the province, the second figure the area in that province. Where there is a third figure the fact that it relates to a suburb of one of the great cities is indicated. By giving the code for the two provinces of Antwerp and Brabant, I shall probably make it perfectly clear.

Province of Antwerp. Area.	Code index No. 1. Code number.	Province of Brabant. Area.	Code index No. 2. Code number.
Antwerp city	10	Brussels city	20
Berchem	111	Anderlecht	210
Borgerhout	112	Etterbeek	211
Deurne	113	Hal	212
Hoboken	114	Ixelles	213
Merxem	115	Laeken	214
Niel	116	Molenbeek St. Jean	215
Wilryck	117	St. Gilles	216
Lierre	12	St. Joost ten Norde	217
Malines	13	Schaerbeek	218
Willebroeck	14	Uccle	219
Gheel	15	Diest	22
Turnhout	16	Louvain	23
Rest of Province	17	Tirlemont	24
		Nivelles	25
		Wavre	26
		Rest of Province	27

In addition to the two complete indexes, the occupational index and the employment forms, all the papers relating to each refugee, the registration form, superseded certificates, notices of change of address, &c., are filed in alphabetical sequence of name so as to constitute a sort of personal dossier.

For the purpose of this paper I need not give any detailed account of the various uses that have been made of the indexes or of the subsidiary partial indexes and detailed returns that have been prepared from time to time. They fulfilled the immediate purposes for which they were required, they occupied the time of the staff to a very large extent, but their interest was fugitive rather than permanent. I purpose instead to make some remarks and to give some figures on an aspect of the question hitherto quite untouched, viz.: to what extent is the refugee population of the United Kingdom typical of the population of Belgium as a whole.

Before doing this, however, there are a few general remarks that may be more conveniently made at this stage than later. First the register is, nominally at all events, one of the civil population taking refuge here. There is an index relating to wounded and disabled Belgian soldiers who have come to this country, compiled and maintained by the Wounded Allies Relief Committee under the authority of the Registrar-General. It is part of the Central Register, but is separately compiled and kept until such time as it is deemed advisable for the Registrar-General to take it over. Into the reasons for which this course was adopted I need not go, it will suffice if I state that the event has justified the decision. For Scotland a complete register is maintained by the City of Glasgow Refugees' Committee as a collecting centre for the Central Register. This work has been admirably performed by Mr. Alexander Walker the city treasurer, and duplicates of all cards in that register are regularly forwarded to the Registrar-General. For Ireland the police act on similar lines to the police in England and Wales.

The existing process of registration may be summarised briefly as follows. On arrival in the United Kingdom the refugee is required to fill up the registration form; a certificate of registration is then issued to the refugee, and the necessary cards for the central indexes are compiled. The card for the principal index is inserted in its proper place, while the cards for the duplicate and occupational indexes are first coded and then inserted in place; if the refugee is a person having an occupation in his own country the form is coded and inserted in its proper place among the occupational forms. On receipt of any notification of change of address the correction is carried out through the various indexes, &c., in the same order, those in the principal index being dealt with on the day of receipt. As will be understood the noting of the change of address in the other places when it is required may involve a change of area coding and a transfer of the form from one division to another. Before leaving the country the refugee has to produce the certificate of registration as one of the preliminaries to obtaining a permit, and the certificate is impounded by the police at the port of embarkation and forwarded to the Central Register.

I propose now to consider the question in the light afforded by the Central Register, "How far is the refugee population of the United Kingdom representative of the population of Belgium as a whole?" or in other words, "Can we regard it is a typical sample of the nation?" It must be remembered that the population of Belgium is a somewhat peculiarly constituted one from the racial and linguistic points of view. Of its nine constituent provinces, four—Antwerp, East and West Flanders and Limbourg—are predominently Flemish, the Flemish element being nowhere less than twenty times as great as the Walloon; four are even more predominently Walloon—Hainaut, Liège, Luxembourg and Namur; while in one province, Brabant, the two elements are fairly balanced. The first point is, how are these elements represented amongst the refugees? The following table, which gives the percentage of total population in and percentage of refugees from each province, shows very clearly that the French-speaking provinces are under-represented by nearly 50 per cent., while Brabant has furnished practically its due quota of refugees.

Province.	Percentage of population of province to total population of Belgium.	Percentage of refugees from province to total of refugees.
	Per cent.	Per cent.
Antwerp	13	41·7
East Flanders	15	6·6
West Flanders	11·5	13·4
Limbourg	4	1·0
Total of Flemish-speaking provinces	43·5	62·7
Brabant	20	19
Hainaut	16·5	4·7
Liège	12	11·8
Luxembourg	3	0·4
Namur	5	1·4
Total of French-speaking provinces	36·5	18·3

Dealing with the provinces as units it will be seen that one province, Antwerp, is enormously over-represented; three, West Flanders, Brabant and Liège, are represented; and the remaining five, East Flanders, Limbourg, Hainaut, Luxembourg and Namur, are much under-represented.

Pushing the inquiry a step further it is apparent that from the geographical point of view there are similar disparities within the provinces themselves. Thus in the province of Antwerp, the city of Antwerp itself, with its three suburbs Berchem, Borgerhout and Deurne, which constitute practically one homogeneous whole, has 41 per cent. of the population of the province and has sent 65 per cent. of the refugees from that province, while Malines, with 7 per cent. of the population has sent nearly 17 per cent. of refugees. These two towns, with rather less than half the population of the province, have contributed over 80 per cent. of the refugees, while the rest of the province contributes only about the same number of refugees as Malines by itself. In all the other provinces the results are similar, as the following table clearly shows.

Province.	Town.	Percentage of population to population of province.	Percentage of refugees from province.
		Per cent.	Per cent.
Brabant	Brussels (city)	20	40
	Louvain	3	9
East Flanders	Alost	3·3	9
	Gand	15	30
	Lokeren	2	4·6
	St. Nicholas	3	6
	Termonde	0·9	9
West Flanders	Ostend	5	56
Hainaut	Charleroy	2·3	9
	Tournai	3	6
Liège	Herstal	2·6	14
	Liège	19	35
Limbourg	Hasselt	6	20
	Tongres	4	10
Luxembourg	Arlon	5	10
Namur	Dinant	2	12
	Namur	9	30

In looking at these figures a word of warning must be given. There is a certain amount of overstatement in the figures relating to Antwerp and Ostend, more pronounced in the case of the latter town than in that of the former, as refugees who had moved into Antwerp and Ostend after the outbreak of the war have in a number of instances given their place of residence in Belgium at their last address in that country.

In the next table I give a comparison between the population of certain areas in Belgium and the numbers of refugees coming from those areas, which illustrates the unrepresentative nature of the refugee population on a somewhat more detailed scale, and incidentally gives the registered places of residence in Belgium of all the refugees who have come to the United Kingdom. This table, like those preceding it, is based on a large sample—over 10 per cent.—of the whole of the principal index.

Province.	Town or area.	Percentage of population of Belgium in town or area.	Percentage of total refugees.
		Per cent.	Per cent.
Antwerp	Antwerp (with Berchem, Borgerhout and Deurne)	5·4	26·5
	Hoboken, Merxem and Wilryck	0·6	1·3
	Lierre	0·4	0·6
	Malines	0·9	6·8
	Turnhout	0·4	0·1
	Willebroeck	0·1	0·5
	Rest of province	5·2	5·2
Brabant	Brussels city	4·0	8·0
	Outer Brussels (Anderlecht, Etterbeek, Ixelles, Laeken, Molenbeek St. Jean, St. Gilles, St. Joost ten Noorde, Schaerbeek and Uccle)	6·4	3·0
	Louvain	0·6	1·6
	Tirlemont	0·3	0·2
	Rest of province	8·7	6·2
East Flanders	Alost	0·5	0·6
	Gand	2·2	2·0
	Lokeren	0·3	0·3
	St. Nicholas	0·5	0·4
	Termonde	0·1	0·6
	Wetteren	0·2	0·1
	Rest of province	11·2	3·6
West Flanders	Bruges	0·75	1·0
	Courtrai	0·5	0·2
	Ostend	0·7	7·5
	Ypres	0·25	0·3
	Rest of province	9·3	4·4
Hainaut	Charleroy	0·4	0·5
	Gilly	0·3	0·1
	Mons	0·4	0·1
	Tournai	0·5	0·3
	Rest of province	14·9	3·4
Liège	Huy	0·2	0·2
	Herstal	0·3	1·6
	Liège	2·4	4·0
	Seraing	0·6	0·4
	Verviers	0·6	0·8
	Rest of province	7·9	4·8
Limbourg	Hasselt	0·2	0·2
	Tongres	0·15	0·1
	Rest of province	3·65	0·7
Luxembourg	Total of province	3·0	0·4
Namur	Dinant	0·1	0·15
	Namur	0·4	0·35
	Rest of province	4·5	0·9

From this table it will be seen that there are about 10 town areas that are more or less heavily over-represented amongst the refugees, about a dozen that are proportionately represented and that the rest of he country is more or less under-represented.

It is probably a commonplace to say that where you have a proprietary peasantry that element of the population is most firmly rooted in the soil and it will be seen that the rural element in Belgium is much under-represented amongst the refugees. The three provinces which are predominantly agricultural—Limbourg, Luxembourg and Namur—with 12 per cent. of the total population of the country, have furnished 2·8 per cent. of the refugees. Further, a reference to the preceding table will show that in the three other provinces with a large agricultural population, East and West Flanders and Hainaut, the "rest of province," which includes the whole of the agricultural population, has 36·3 per cent. of the population of Belgium and has only furnished 11·4 per cent. of the total refugees.

Turning to the urban representation it will be seen that two towns, Antwerp and Ostend, with less than one-sixteenth of the total population of Belgium, have furnished one-third of the refugees. Allowing for the overstatement already mentioned, there still remains an enormous over-representation of these two places, and it would perhaps not be too much to say that two places less representative of Belgium as a whole cannot be found in the whole country. Great ports and ultra-fashionable watering-places have invariably populations more or less peculiar to themselves, containing certain elements in great excess and being conspicuously lacking in others. It is not within my province to say whether these populations are in any respects superior or inferior to the general mass of the population. Probably there is much to be said on both sides of this question, and it is fortunate that we are not called upon to attempt to strike any balance in a matter at once so delicate and so complex. If it be conceded that I am right in my general contention that such populations are not true representative samples, I have established my point.

Summing up this section of my inquiry, the conclusion arrived at may be briefly enunciated:—

1. As between the Flemish and Walloon elements the former is over-represented.
2. As between province and province the representation is grossly unequal.
3. As between rural and urban populations the former is much under-represented.
4. As between one urban area and another the representation presents striking inequalities.

There is another point of view from which the question of the representative character of the refugees may be considered—that of their occupation. A brief consideration of the tables in the appendix to this paper will demonstrate that from this point of view also the refugee population is not a representative one. Certain professions and occupations are much over-represented, while others are equally under-represented. Let us take the professional classes as represented by law, medicine and education. The comparisons have had to be made with the figures for occupations given in the Belgian Census Report of 1900, these being the latest at my disposal. The rates are as follows :—

	Rate per mille to total occupied in Belgium.	Rate per mille to total occupied among refugees.
MALES.		
Law	2·8	9·3
Medicine	1·9	3·0
Education	7·1	9·3
Total	11·8	21·6
FEMALES.		
Medicine	4·7	16·2
Education	20·5	58·5
Total	25·2	74·7

Thus in these professions we find that amongst the male refugees the over-representation is nearly double, while amongst the females it is nearly treble. The clerks are even more heavily over-represented, the rate per thousand being in Belgium, males, 17·4, females, 3·5; whilst amongst the refugees the rates are, males 54·8, females 43·0. The most heavily over-represented calling is that of the fisherman, which, while it constitutes only 1·2 per 1,000 of the occupied in Belgium, represents 12·4 of the employed refugees. The most important group amongst the refugees from the numerical standpoint is that of the iron and metal trades, numbering as it does over 13,000 persons, and showing an over-representation of more than 100 per cent. There are, of course, quite obvious reasons why this group and that of the fisherman should be over-represented; the latter was provided in most cases with his own means of escape, the former was pretty certain of finding immediate employment in this country. Amongst the female refugees there is also a very heavy over-representation of the domestic servant class, these numbering over 5,000. Another heavily over-represented class is that of goldsmiths and lapidaries, a result due almost entirely to the tremendous influx of refugees from Antwerp.

On the other hand, as was to be expected from the facts brought forward in the earlier part of this inquiry, agriculture is much under-represented. The Belgian figures give 240 males and 182 females out of every 1,000 employed as being engaged in agriculture, but amongst 1,000 male refugees to this country only 34 were agriculturists, while amongst 1,000 female refugees there were only 18. In other words, if we take the men and women in combination the agricultural refugees were only one-eighth of what they should have been to be proportionally represented. The other important industrial groups which are much under-represented are those engaged in mines and quarries and in textile manufactures. The Belgian and refugee rates in these cases are as follows :—

	Belgian rate.	Refugee rate.
MALES.		
Mines, quarries and their products	91·5	24·7
Textile manufactures	44·2	18·2
FEMALES.		
Mines, quarries (products)	9·9	0·2
Textile manufactures	58·1	22·1
Lace and embroidery manufacture	77·9	18·5

The causes of these under or over-representations are various, and while some are obvious enough others do not admit of any very simple explanation. There can be little doubt that the course and character of German war operations in Belgium have had a very considerable influence, but to try to determine the extent of this would be not only beyond my powers but outside the modest limits of my paper. The figures given in the tables in the appendix should, however, prove most valuable to anyone who has the time and the knowledge for the elucidation. It has been possible for me to show not only the extent to which the refugees do not represent the general population of Belgium, but also in a general way the character of that over- or under-representation.

It may be remarked that at the opening of this section of my paper I alluded to the linguistic constitution of Belgium. It was my original intention to pursue this investigation into the non-representative character of the refugee population by inquiry into the languages spoken by the refugees, and I had made some progress on these lines when I abandoned the undertaking. This abandonment was brought about by a variety of causes, the most important being that I was satisfied that no satisfactory comparisons could be made. The long and elaborate tables given in Vol. III of the 1910 Census Report for Belgium appear to me suspect, and the results of my own researches into the question on the refugee register have confirmed my view of the unreliability of this section of the Belgian Census. Then I find that the language question is one that invariably becomes a battle ground on which prejudice is apt to take the place of judgment and passion the place of reason. It is one of those intimate domestic questions which the disinterested outsider is well advised to leave to be settled by the members of the family concerned, for one is apt to find that if you try to pour oil on troubled waters you succeed actually in adding fuel to the flames.

In conclusion may I say that I make no extravagant claims for the Central Register. No one has a keener consciousness of its defects, but on the other hand no one knows so well the difficulties that have had to be encountered and overcome. We had not only to create a new machine, but to evolve a staff out of men and women who were entirely untrained in the work to be done. We had to learn in the unpleasant school of failure how to achieve some measure of success. What the precise measure of that success has been must be left to be determined by the event. One thing, however, I can do, and that is to put on record my personal tribute to much good service rendered by our temporary staff, to many cases in which the most commendable zeal and intelligence have been displayed by its members. At its maximum that staff numbered nearly 100 and consisted of English and Belgians of both sexes. The services of some of these of both sexes and of both nationalities have been of the greatest value. Of my colleagues of the General Register Office and Census Office staff who have assisted in the work I can speak in the highest terms. They showed themselves indefatigable in energy and in resource. Until the work of the National Register claimed his attention, the Registrar-General led us with an energy and vigour that often left me like panting Time to toil after him in vain.

Our work naturally brought us into close touch with the Belgian civil and military authorities in this country and our relations with them have always been of the most cordial character. They have shown a keen and thorough appreciation of our efforts, and although it has not been possible to meet their desires on every point they have cordially and courteously recognised that our limitations were not those of our will but of our power.

TABLE I.—*Showing the number of persons of certain specified occupations according to the Belgian Census of* 1900, *and the number of employable refugees who have arrived in this country.*

Occupations.		Belgian Census of 1900. Males, 2,219,748; females, 900,322 (excluding army, monks, nuns, &c.).	Refugees.
			Total: Males, 70,731; females, 16,584.
1. Post office, railway service and conveyance	M.	56,556	7,124
	F.	2,054	88
2. Police	M.	6,961	203
3. Government and municipal (including hospitals)	M.	55,796	1,061
	F.	1,272	73
4. Army (*not* included)	....	—	—
5. Clergymen, church service (monks, nuns *not* included)	M.	11,502	368
	F.	264	16
6. Lawyers, law clerks	M.	6,109	661
	F.	21	3
7. Doctors, medical service	M.	5,474	320
	F.	4,228	268
Doctors (included in 7)	M.	4,182	215
8. Teachers	M.	15,864	657
	F.	18,482	970
9. Literary, scientific service, surveyors	M.	3,644	402
	F.	137	27
10. Civil engineers, architects	M.	3,088	536
	F.	2	—
11. Other art service	M.	12,729	1,289
	F.	2,009	387
12. Domestic servants and cooks	M.	15,243	461
	F.	120,499	5,290
13. Other domestic services	M.	42,342	153
	F.	24,162	868
14. Clerks	M.	38,630	3,896
	F.	3,134	713
15. Stockbrokers, agents, travellers	M.	15,560	1,850
	F.	984	27
16. Bank, insurance service, merchants	M.	6,788	1,865
	F.	482	204
17. Agriculture	M.	533,811	2,437
	F.	163,714	292
18. Fishing....	M.	2,689	874
	F.	32	8
19. Mining, quarrying and working in stones, &c.	M.	200,321	1,747
	F.	8,915	3
20. Iron and steel manufacture (including iron founding)	M.	36,618	542
	F.	777	—
21. Other metal manufactures	M.	12,654	100
	F.	466	—
22. Machine manufacture (engineering)	M.	107,112	8,446
	F.	2,492	40
23. Gunsmiths	M.	13,426	1,666
	F.	1,017	129
24. Boat-building	M.	1,927	514
	F.	15	2
25. Construction of vehicles (including motor cars)....	M.	13,312	1,877
	F.	73	33

Table showing the number of persons of certain specified occupations, &c.—Contd.

Occupations.		Belgian Census of 1900.	Refugees. Total.
26. Goldsmiths, lapidaries	M.	7,221	2,167
	F.	529	111
27. Watch, clock makers	M.	2,390	82
	F.	14	2
28. Workers in instruments, games, &c. (including electricians)	M.	4,729	1,445
	F.	373	29
29. Building and works of construction (except carpenters, paperhangers)	M.	120,830	3,579
	F.	438	3
30. Upholsterers, paperhangers	M.	10,348	359
	F.	311	15
31. Carpenters, cabinet makers, wood workers	M.	109,990	4,009
	F.	1,763	94
32. Cane, straw workers	M.	2,785	116
	F.	2,976	67
33. Brick, tile, earthenware manufacture....	M.	19,506	285
	F.	2,836	30
34. Glass manufacture	M.	19,705	371
	F.	2,460	15
35. Dye, paint, chemicals, rubber, &c.	M.	10,652	508
	F.	2,242	105
36. Working in skins and leather	M.	8,530	243
	F.	1,319	59
37. Saddlers	M.	4,051	118
	F.	22	2
38. Brush, feather, &c., making	M.	2,524	72
	F.	1,345	14
39. Paper works, bookbinding	M.	8,225	129
	F.	3,249	45
40. Printing	M.	12,831	511
	F.	674	18
41. Textile manufactures and oilcloth-making	M.	96,418	1,224
	F.	52,362	366
42. Lace manufacture (not in 41)	M.	1,228	50
	F.	65,223	135
43. Embroidery making (not in 41)	M.	387	17
	F.	4,831	172
44. Seamstresses, milliners, cap-makers	M.	2,591	56
	F.	42,780	1,163
45. Tailors, dressmakers	M.	31,178	1,029
	F.	103,518	1,818
46. Boot, shoe-making	M.	41,839	697
	F.	3,598	43
47. Other workers in dress	M.	3,197	120
	F.	7,340	85
48. Hairdressers	M.	8,342	402
	F.	491	53
49. Workers in food	M.	29,492	369
	F.	1,828	32
50. Bread-makers	M.	25,906	640
	F.	1,305	23
51. Tobacco manufacture	M.	9,306	240
	F.	2,770	102

Table showing the number of persons of certain specified occupations, &c.—Contd.

Occupations.		Belgian Census of 1900.	Refugees, Total.
52. Maltsters, brewers, &c.	M.	18,067	369
	F.	464	15
53. Eating, boarding house, hotels wine merchants	M.	105,632	1,334
	F.	58,502	461
54 Dealers in food	M.	59,102	1,294
	F.	43,108	360
55. Dealers in dress and textile fabrics	M.	16,947	561
	F.	14,296	378
56. Other dealers	M.	58,010	2,359
	F.	22,316	812
57. Gas, electricity, sanitary, sewage	M.	3,834	144
	F.	119	1
58. Others (including dock labourers, factory labourers and workers undefined, &c.	M.	145,799	6,783
	F.	99,689	517

TABLE II.—BELGIAN OCCUPATIONS.—*Rate per* 1,000 *of certain specified occupations to the total occupied population at the Census of* 1900 *and also to the occupied refugees who have visited this country.*

Occupations.		Belgian Census of 1900. Males, 2,219,748 ; females, 900,322 (excluding army, monks, nuns, &c.).	Refugees. Total : Males, 70,731 ; females, 16,584.
1. Post office, railway service and conveyance	M.	25·5	100·7
	F.	2·3	5·3
2. Police	M.	3·1	2·9
3. Government and municipal (including hospitals)	M.	25·1	15·0
	F.	1·4	4·4
4. Army (*not* included)	....	—	—
5. Clergymen, church service (monks, nuns *not* included)	M.	5·2	5·2
	F.	0·3	1·0
6. Lawyers, law clerks	M.	2·8	9·3
	F	0·0	0·2
7. Doctors, medical service	M.	2·5	4·5
	F.	4·7	16·2
Doctors (included in 7)	M.	1·9	3·0
8. Teachers	M.	7·1	9·3
	F.	20·5	58·5
9. Literary, scientific service, surveyors	M.	1·6	5·7
	F.	0·2	1·6
10. Civil engineers, architects	M.	1·4	7·6
	F.	0·0	—
11. Other art service	M.	5·7	18·2
	F.	2·2	23·4
12. Domestic servants and cooks	M.	6·8	6·5
	F.	133·8	319·1
13. Other domestic services	M.	19·1	2·2
	F.	26·8	52·4
14. Clerks	M.	17·4	54·8
	F.	3·5	43·0

Belgian Occupations.—Rate per 1,000 *of certain specified occupations, &c.—Contd.*

Occupations.		Belgian Census of 1900.	Refugees. Total.
15. Stockbrokers, agents, travellers	M.	7·0	26·2
	F.	1·1	1·6
16. Bank, insurance service, merchants	M.	3·0	26·4
	F.	0·5	12·3
17. Agriculture	M.	240·5	34·4
	F.	181·9	17·6
18. Fishing	M.	1·2	12·4
	F.	0·0	0·5
19. Mining, quarrying, and working in stones, &c.	M.	91·5	24·7
	F.	9·9	0·2
20. Iron and steel manufacture (including iron founding)	M.	16·5	7·7
	F.	0·8	—
21. Other metal manufacture	M.	5·7	1·4
	F.	0·5	—
22. Machine making (engineering) and working in metals	M.	48·2	119·4
	F.	2·8	2·4
23. Gunsmiths	M.	6·0	23·5
	F.	1·1	7·8
24. Boat-building	M.	0·9	7·3
	F.	0·0	0·1
25. Construction of vehicles (including motor cars)	M.	6·0	26·5
	F.	0·1	2·0
26. Goldsmiths, lapidaries	M.	3·2	30·6
	F.	0·6	6·7
27. Watch, clock makers	M.	1·3	1·2
	F.	0·0	0·1
28. Workers in instruments, games, &c. (including electricians)	M.	2·1	20·4
	F.	0·4	1·8
29. Building and works of construction (except carpenters, paperhangers)	M.	54·4	50·6
	F.	0·4	0·2
30. Upholsterers, paperhangers	M.	4·7	5·1
	F.	0·3	0·9
31. Carpenters, cabinet makers, wood workers	M.	49·4	56·7
	F.	1·9	5·7
32. Cane, straw workers	M.	1·3	1·6
	F.	3·3	4·0
33. Brick, tile, earthenware manufacture	M.	8·8	4·0
	F.	3·2	1·8
34. Glass manufacture	M.	8·9	5·2
	F.	2·7	0·9
35. Dye, paint, chemicals, rubber, &c.	M.	4·8	7·2
	F.	2·5	6·3
36. Working in skins and leather	M.	3·8	3·4
	F	1·5	3·6
37. Saddlers	M.	1·8	1·7
	F.	0·0	0·1
38. Brush, feather, &c., making	M.	1·1	1·0
	F.	1·5	0·8
39. Paper workers, bookbinding	M.	3·7	1·8
	F.	3·6	2·7
40. Printing	M.	5·8	7·2
	F.	0·7	1·1

Belgian Occupations.—Rate per 1,000 *of certain specified occupations, &c.—Contd.*

Occupations.		Belgian Census of 1900.	Refugees. Total.
41. Textile manufactures and oilcloth-making	M.	43·4	17·3
	F.	58·1	22·1
42. Lace manufacture (not in 41)	M.	0·6	0·7
	F.	72·5	8·1
43. Embroidery making (not in 41)	M.	0·2	0·2
	F.	5·4	10·4
44. Seamstresses, milliners, cap-makers	M.	1·1	0·8
	F.	47·5	70·2
45. Tailors, dressmakers	M.	14·0	14·6
	F.	115·0	109·7
46. Boot, shoe-making	M.	18·9	9·9
	F.	4·0	2·6
47. Other workers in dress	M.	1·4	1·7
	F.	8·2	5·1
48. Hairdressers	M.	3·8	5·7
	F.	0·6	3·2
49. Workers in food	M.	13·3	5·2
	F.	2·9	1·9
50. Breadmakers	M.	11·7	9·0
	F.	1·4	1·4
51. Tobacco manufacture	M.	4·2	3·4
	F.	3·1	6·2
52. Maltsters, brewers, &c.	M.	8·1	5·2
	F.	0·5	0·9
53. Eating, boarding house, hotels, wine merchants	M.	47·6	18·9
	F.	65·0	27·8
54. Dealers in food	M.	26·6	18·3
	F.	47·8	21·7
55. Dealers in dress and textile fabrics	M.	7·6	7·9
	F.	15·9	22·8
56. Other dealers	M.	26·1	33·4
	F.	24·8	49·0
57. Gas, electricity, sanitary, sewage	M.	1·7	2·0
	F.	0·1	0·1
58. Others, including dock labourers, general labourers, factory labourers, and workers undefined, &c.	M.	65·7	95·8
	F.	110·8	31·1

DISCUSSION ON MR. DE JASTRZEBSKI'S PAPER.

MR. A. MAUDSLAY (the Hon. Secretary of the War Refugees Committee) said it gave him very great pleasure to be allowed to propose a vote of thanks to Mr. de Jastrzebski for his most interesting Paper. He himself knew from his personal knowledge of trying to make a card index in the early days of the inrush of Belgian refugees, what a difficult thing it was to discriminate between written Flemish names without having had vast experience of the Flemish language. He knew the great difficulties that had arisen in analysing those names, because a turn of the pen might mean the designation of a totally different family. It was a task that required the very greatest care and the closest scrutiny. The author had spoken in his Paper of the pre-registration days when the registration of the refugees was first instituted at the premises of the Aldwych Committee, and a department was created to deal with the subject. Inquiries were received at that department from thousands of people in person during the months of September and October, when Antwerp fell. A card index of some 16,000 names was compiled. A separate index was also set up for wounded soldiers. All that work was voluntarily done by some kind ladies who spoke French and Flemish. The staff at Aldwych being composed of voluntary workers at the time, it naturally took some time to compile the card index, and they met with the very greatest difficulty in being able to put it into anything like shape. The task soon became too great, because inquiries by letter came in in thousands, and it was a great relief to the Aldwych Committee when the Registrar-General and his colleagues came one afternoon in October and offered, on behalf of the Government, to relieve the Aldwych Committee of that great burden. At the same time the card index relating to the wounded soldiers was transferred to the Belgian Committee at the Kingsway offices. At the instance of the Registrar-General they had endeavoured to keep a bureau of information, with the addresses of all refugees who passed through their hands. At that bureau the forms of registration were filled up and then forwarded to Somerset House. Forms of inquiry were also filled in, so that Somerset House could give information to friends and relatives inquiring about refugees. It naturally took some time for the Registrar-General's staff to have the list sufficiently in order to supply information to the War Refugees Committee, but proper forms were now being sent to Somerset House, and he hoped that everything was going on in the proper manner. He would only add that the Register of Belgian Refugees as now compiled had been of the very greatest service to their work amongst the Belgian refugees, and, on behalf of his Committee, he had much pleasure in formally proposing a vote of thanks to Mr. de Jastrzebski for his interesting Paper.

Sir Edward Brabrook said he had pleasure in seconding the vote of thanks to the author for his interesting Paper. He ventured to think they were indebted to him not merely for what appeared in the printed Paper, but also for those observations which he had interjected without manuscript. They were sympathetic, interesting, and much to the point. The author had contributed, he thought, a document to the Society which would stand in history, and he could not help thinking that if at the time of previous incursions of refugees into this country—for instance, at the time of the revocation of the Edict of Nantes—they had only possessed the same detailed information with regard to those refugees that they now possessed in the register which the Registrar-General had obtained of the refugees from Belgium, it would be a historical document of the greatest possible importance. Therefore, their thanks were eminently due to the author of the Paper.

The Chairman said there were various gentlemen there that evening who had been closely connected with this work. There was the Vicomte de Beughem, who was on the Committee which sits at India House and Kingsway, and there was also Mr. H. A. Leggett, who is the Secretary of the War Refugees Committee. He (the Chairman) did not know whether they would be disposed to say a few words to them on the subject. We should be very glad to hear them if they are.

The Vicomte de Beughem (speaking in French) referred to the value the Register had been to him in recruiting the Belgian army. As a result of the Royal Belgian Decree of March 1, 1915, he had: first, to organise the recruiting commissions in the United Kingdom, which required the knowledge *a priori* of the approximate number of Belgians of military age; and secondly, to search for these men disseminated all over the United Kingdom, and to make them appear before the recruiting commissions. This matter would have been exceedingly difficult, if not impossible, had the Alien Registration Act and the Register of Somerset House not been there. Thanks to these circumstances it had been possible to find in the United Kingdom about 13,000 soldiers who were sent to the training camps organised in France to serve as reserve for the army in the field. To-day there remained still to be found about 1,000 defaulters and deserters, who succeeded in escaping by giving false names, or registering themselves under false addresses, or who did not register at all. This work was in a fair way of completion, and he took this opportunity to thank all the British authorities, and in particular the Registrar-General and his officer, Mr. de Jastrzebski, for the help and assistance they had continually given him.

Mr. H. A. Leggett said he was afraid he really had nothing to add to the discussion, because at the time he was Secretary of the Departmental Committee appointed by the Government to inquire into the subject of the Belgian Refugees the register was very far from complete, and it was almost impossible, he thought, for Somerset House to supply them with, or for the Committee to get, any reliable figures as to the extent of the problem before the country at that time. Later on, when a Commission was appointed by the Government to put into operation the recommendations of the Committee, the employment of the refugees was a matter with which they were primarily concerned, and they were supplied by the Registrar-General with an enormous amount of most valuable information as to the manner in which the refugees had succeeded in getting employment. The Labour Exchanges placed many thousands; he could not give the figure, but he had no doubt that Mr. Colegate, of the Labour Exchanges Department, who was present, could give it to them. He would like to pay one small tribute to the work of the local committees all over the country in getting employment for refugees which it had not been possible to obtain through the ordinary official channels. Those local committees devoted time and trouble—personal trouble of the most extreme kind—to finding all manner of jobs for all kinds of people, and they fitted square pegs into round holes, and round pegs into square holes, all over the country. There had been a very great desire on the part of the Belgians to take work. There were people in every country who did not care about work and who would not work if they could help it. But the vast majority of the Belgian refugees were only too ready to take every opportunity of turning their hands to something so that they might use their leisure time—of which they had a great deal—to relieve their hosts of the burden (a pleasant one in a great many cases, but a heavy financial burden very often) in regard to them. He was glad to have this opportunity of paying his tribute to the Belgians in that respect.

The Chairman (the Right Hon. Lord George Hamilton) said that if no one else wished to add anything to the discussion, he might perhaps be the mouthpiece to convey to the reader of the Paper the vote of thanks which had been moved, and to express their great gratification that the author had been good enough to lay before them so interesting and so practical a Paper. It was very satisfactory to learn from the Vicomte de Beughem that the information supplied to him enabled him to substantially recruit the Belgian army. That was not the least satisfactory of the consequences which the registration had given rise to. Speaking for himself, he was at Deal when the first great rush of refugees came over. It was a small place, but they had to make provision for something like thirteen hundred refugees at very short notice; and he entirely endorsed what Mr. Leggett said, that nothing could have been more praiseworthy than the manner in which everybody connected, either officially or unofficially, with the work of registration bestirred themselves in placing these unfortunate people in situations where they would be able to earn a livelihood. He was sure that the organisation in connection with this branch of the subject was one of which they might fairly be proud. As Sir Edward Brabrook had said, the information compiled there was very valuable, and he only wished that in the past there had been some statistician who had been able accurately to compile information concerning forced movements of population such as that which was effected by the revocation of the Edict of Nantes. It was very melancholy for him, as an old statistician, to think that as one got towards the close of one's life, the Statistical Society, whose object had been in the past to record the progress of the human race, the increase of wealth, and the growth of prosperity, should find in this war material of a very different character. The acts of infamy to which the author of the Paper referred, which drove the unfortunate population out of Belgium, had not been confined to Belgium. They were part and parcel of the system which had been taught to German officers, and carried out by the German General Staff in every country which the German army had occupied. The same thing had gone on in France, in Poland, in Courland, and in Serbia. Therefore there would be a melancholy mass of material available for the statistician to show that, though civilisation had increased, the brutality of those who professed the highest culture had more than correspondingly increased. He was sure the author would be pleased to see how very much his Paper had been appreciated, and on behalf of the Statistical Society he begged to convey to him their best thanks for the excellence of that Paper.

Mr. T. T. S. de Jastrzebski, in reply, thanked the meeting most sincerely for the extremely kind way in which they had received his humble effort. As he had said at the beginning, it was hardly a subject on which an experienced statistician would care to expand himself. Fortunately for himself he was not an experienced statistician. It was said that the Kingdom of Heaven was sometimes entered by violence ; and he had entered the kingdom of statistics in that way at an advanced age and was only now beginning to feel his feet. It was certainly due to the War Refugees Committee that one should say what wonderful work they did. In the course of his Paper, which had been concerned entirely with the Somerset House register, the only reference he had been able to make to the War Refugees Committee was that their records were unreliable. But he could assure the meeting that the fact that those records were as good as they were, had been a source of wonderment to the compilers of the register, when the conditions under which the Committee had worked were considered. At Somerset House they had worked under conditions much more favourable. He wished to pay the warmest tribute to the extraordinary zeal and intelligence displayed by those voluntary workers in the early days before the work of registration had been undertaken at all. Their work was done in the most difficult circumstances conceivable, where, as he had himself seen, the refugees practically did not know what they were saying, and where the interpreter combined an ignorance of Flemish with a want of knowledge of English. In those circumstances it was wonderful that anything had been done at all. He quite agreed as to the extraordinary value it would have been to the history of this country had there been something of this sort done at the time of the great influx of Huguenot refugees into England, and he could assure the Society that from the inception of this register they had it steadily before their minds that, in addition to the work they were doing for the refugees, they were endeavouring to compile something which would be of value to future students of the economic and social history of the country. They had kept that steadily and persistently in mind from the very beginning. For the very little he had been able to do for him, the Vicomte de Beughem had been very flattering. As he had said in his Paper, it had never been want of will, but want of ability on their part, and if they could have scraped together all the brave Belgians who had hidden themselves in order to escape military service, they would have scraped them together and brought them all forward for military service with the greatest of willingness. He was very pleased to hear Mr. Leggett speak so highly of the work of the local committees. Many of those committees did yeoman service. Of course it must be remembered that their work at Somerset House on the register had not been work done in personal touch with the refugees at all. As a matter of fact he had endeavoured to avoid that altogether. To him the refugee was an abstraction on a card. He did not want to imagine the refugee as a human being at all; because the moment the personal element came in, if one once sat down and thought what one was doing, one would have broken down. Most of the work that had to be done by the local committees was work that could only be done by personal contact and personal service. And he thought the way in which, as a whole, the people of this country received, looked after and gave personal service to the unfortunate sufferers who came from Belgium, would be one of the proudest records in the history of this country. Nothing remained but for him to thank the meeting very much for the kind manner in which they had received his Paper, and he expressed the hope that by this time next year, if they called upon him to do so, he might be able to give them an account of the repatriation of the refugees from Belgium.

A vote of thanks was passed unanimously.

The following Candidates were elected Fellows of the Society:—

Abd el Kereem, M.A.
Arthur Frank Goodman.
Alfred Hartwell.
William Whiteford Jenkins.
Matthew Keating, M.P.
Arthur Wilhelm Madsen, B.Sc. Edin.
Edward Penton.
Sir George Saltmarsh.

On the Statistical Enquiries needed after the War in Connection with Eugenics.

By Major Leonard Darwin, Sc.D.

[Read before the Royal Statistical Society, February 15, 1916, the President, The Right Hon. Lord George Hamilton, G.C.S.I., in the Chair.]

The war we are now engaged in is certainly the greatest in all history, though much that these words cover is, as yet, a closed book for us. As to the casualties we know, it is true, from an answer given by the Prime Minister on December 23 last, that the number of men killed in action, died of wounds and missing was then estimated as being a little short of 190,000, whilst there were nearly 340,000 wounded. Unfortunately our ignorance of the proportion of Colonials and Indians included in these totals makes it impossible to calculate these figures as percentage of the population of this country, and it can only be said that the killed and missing are less by this proportionate amount than 2·3 per cent., and the wounded less than 4·2 per cent. of the total men of the country available for war. If the war lasts another year these figures may well be more than doubled; and we may then find that the total casualties amount to over 13 per cent. of the population available for war, to say nothing of the deaths by disease. That this is not an exaggerated statement may be seen by reference to the German published lists of casualties which, we were informed in Parliament on January 19 of this year, then amounted to over 2,500,000, a figure which I take to represent about 21 per cent. of the number of the men available for war; whilst, as to the actual casualties up to this date, this percentage may be well over 30 according to some authorities. In some respects it may be necessary to discount these figures considerably; because, for example, of the fact that one man may be wounded several times. But when other circumstances are taken into account, however, especially when the killing of more than 7,000 and the wounding of more than 13,500 of our officers is remembered, these figures of British casualties will seem to be even more grave. From the very imperfect data available, the death-rate amongst officers appears to have been not far short of double of that amongst the men, in which case it may be that over 4½ per cent. of the fighting men of the class from which they are drawn have already perished. Indeed this figure may be too low if, as is probable, the proportion of this class who volunteered early for the war is above the average. The number of undergraduates at Cambridge had fallen little short of 80 per cent. since the war began, whilst by May last 380 Cambridge men had been killed and 500 wounded, and this gives, I believe, a fair indication of the way in which University men generally are taking part in the war. And if these men represent a selected class of the community, it must not be forgotten that as we ascend in the scale of merit the numbers fall off very rapidly; for example, assuming the distribution to be normal, if the fighting men of the country were divided into seven classes, differing equally from each other in average merit, then only about two thousand of them would be found in the highest of these classes.[1]

The foregoing figures have been given not merely to show the magnitude of the present war and how grievous are its immediate consequences, but also to raise the question whether attention ought not even now to be directed to the probable effects of this destruction on the racial qualities of future generations. This branch of the subject is likely to receive inadequate attention because the suffering which we see around us naturally seems at all times to call for our first efforts, and demands of this nature, however laudable they may be, always make forethought in national affairs a difficult matter. No doubt during the war we must devote all our available energies to winning the war, and statisticians are for the most part so busy in this direction as to make other extensive enquiries quite impossible. But especially in view of the probable neglect of this subject in the future, it may even now be justifiable to consider in broad outline what enquiries ought to be instituted and what eugenic problems will most need attention when peace gives more leisure, with the view of ensuring that the plans for the rebuilding of the nation shall then be correctly designed. Such a preliminary discussion will, moreover, make it easier to decide both now and when the time for action comes whether a *prima facie* case for the necessity for holding such an enquiry has been established. Many important questions would have to be considered, and these for convenience of discussion may, in so far as they are eugenic, be divided under four heads:—

(1) At the conclusion of the war to what extent will the nation have been racially damaged?
(2) To what extent will this racial damage reappear in subsequent generations?
(3) In what ways will this racial damage injuriously affect the nation as a whole?
(4) And how can this damage best be remedied?

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[1] *Hereditary Genius*, Galton, p. 30. Of his sixteen classes I have neglected the very small top and bottom classes.

(1) *At the Conclusion of the War, to what extent will the Nation have been racially damaged?*

By racial damage is here meant the average deterioration of the nation as regards those desirable qualities which are, to some extent at all events, handed down to posterity by the agency of natural inheritance. Now, from the eugenic point of view, this damage must be measured not only with reference to the qualities of the individuals killed, but also with regard to the extent to which those individuals would actually have transmitted these qualities had they lived. If a man had had half his destined family before he went to the war, his loss would only be equivalent to the loss of half a life from the racial point of view; and what we really have to consider is the diminution of the progeny of our fighting men because of the war. We shall no doubt in time learn the total number of deaths amongst our fighting forces during the war, whether in action, in hospitals, in prisons, or at home; and if from this total be deducted the calculated number of deaths in such a population in peace time, the remainder would be the number of the deaths fairly attributable to the war. Then it might be possible to obtain from the Paymaster's Department the average size of the family of the soldier on enlistment, due account of course being taken of the number of unmarried men; and if this number were deducted from the average number of the completed family of the whole nation, the difference would give the average loss of progeny per head of those who had died in the war, and thus would enable a calculation to be made of the total ultimate loss of progeny on that account. There would, however, be other elements which ought to be taken into account which would be far more difficult to deal with. There will be some loss of fertility on the part of the injured and maimed in all probability. Then war brings with it an increase of venereal disease, with its sterilising and worse than sterilising effects. Lastly, the mere absence of men from their homes, even if uninjured, would produce some immediate diminution in the size of their families. On the other hand, war excitement and war allowances have had the effect of raising the marriage-rate, that during the quarter ended September 30, 1915, being the highest ever recorded in England and Wales, namely, 21·8 per thousand as compared with 17·3, the average figure for the previous ten years; an increase likely, however, to be largely compensated for by a decrease in succeeding years. But even if the best estimate possible were made of the total loss of progeny of the fighting forces, and an attempt in this direction should, in my opinion, undoubtedly be made, though we should thus get a general idea of the magnitude of the problem to be dealt with, we should be far from its solution. We should thus learn nothing as to the effects of the war on the racial qualities of the nation of the future; for that racial harm—or racial benefit—will depend on the degree in which those killed or sterilised by the war are on the whole above—or below—the mean level of the whole community in what Galton called civic worth. And no statistical method of answering this question has as yet been suggested.

Other means must, therefore, it seems be sought if any knowledge is to be obtained concerning the racial damage done to the nation by the war. Investigations have been made which indicate, so it is held, that the stature of the French nation diminished materially after the Napoleonic wars, and many years hence it will be possible to enquire into the effects of this war in a similar manner. But this will be a test not readily applicable to this generation, because there is now no ready means of ascertaining the average height of the adult population. Opportunities of measuring youths as they grow into manhood will be frequently obtainable; but this will be of little immediate use, because until those born after August, 1914, come to be measured, a population wholly unaffected by the war will be under examination. This method will, in fact, hardly be available before the year 1932.

Granted that it is impossible directly to measure the innate qualities of a people, should not we enquire whether there is not some indirect method of solving this problem? Is there nothing which is closely correlated with the qualities which we desire to measure which can itself be measured? Length of life, whether in itself desirable or not, is certainly largely dependent on certain desirable innate physical qualities, that is on natural good health; and as to prolong life is equivalent to a lowering of the death-rate, it will be possible by studying the death-rate in successive age classes before and after the war to obtain some indication as to the extent of the damage to the innate physique of the nation—not, however, a very certain indication since creaky doors often hang longest. No doubt the wounded and indeed the unwounded will probably have a higher death-rate because of the war, and this is a source of error difficult to allow for. Moreover, changes in the death-rate may be taking place from causes not directly connected with the war. Some of these causes will, however, probably affect women equally with men; and it might possibly be worth while to compare the female death-rates before and after the war, allowance being made for any change in the marriage-rate and consequently in the number of the deaths in child-birth. In short, it ought to be possible a few years after the war is over to ascertain approximately any change in the male death-rate directly attributable to the war, and thus to get a rough indication of any deterioration in those inborn qualities of the nation which are the basis of physical good health. The mean of the quarterly death-rates for 1915 was 15·1 per thousand as compared with 14·4 for the average of the previous ten years; but the significance of the rise, which we thus see has already taken place, is certainly open to question.

No other means of attempting to gauge the physical deterioration of the nation has occurred to me, though other suggestions may very likely be made. It would perhaps be interesting to compare the records of championship athletic meetings held before and soon after the war. Should school athletic records also be studied when peace comes, it would be necessary to remember that the war would not have affected the quality of the competitors. But if the championship records were to show a falling-off, whilst no similar change took place with regard to the school meetings, not only would this give some slight indication of the physical qualities of the nation having been damaged, but it would also point to the great importance of studying the preservation and the multiplication of this undamaged section of the community. Difficult as is the measurement of the physical harm done to a people, their mental deterioration is even harder to recognise, and it had better be frankly admitted that no reliable test of any deterioration of the mental vigour of the nation can here be suggested.

But even if the attempt to actually measure the racial damage due to the war would have to be abandoned, enquiry should certainly be made as to its probable racial effects; and here three distinct eugenic questions, which are often confused together, should be held in view:—(1) What are the comparative racial effects of war as between the victorious and the vanquished nations? (2) Does the nation select its better or worse men to be its fighters? (3) And lastly, have the better or worse men a higher death-rate from war? As I am here only dealing with national topics, the first of these questions, that is, whether success in war is any criterion of innate superiority amongst nations, and what are its ultimate effects as compared with defeat on their relative rates of multiplication, will not be considered. Passing on to the second question, and dealing with the rank and file first, our national material goes through several siftings before it comes under fire, the classes more or less sifted out being the following:—(*a*) The shirker, and, as I believe, the larger class of men who correctly recognise their own mental or physical incapacity to serve effectively as fighters. (It must be remembered that even if compulsion should bring all those who are physically fit into the ranks before the war is over, yet these late comers will have a far lower war death-rate than the earlier volunteers.) (*b*) The rejected at enlistment. (*c*) Those turned out on account of conduct or physical unfitness before the unit enters the fighting line, and those purposely left at home—in all a large class. (*d*) Those invalided, a process which continuously tends to weed out the less fit from the fighting line. The selective influence acting in a contrary direction due to the retention at home of a number of strong and competent persons on account of their good qualities must, of course, be given due consideration, and the numbers of all these different groups should, as far as possible, be ascertained. The relative effects of these contrary selective influences will, however, probably remain largely a matter of opinion, and the views on this point of a number of persons intimately associated with the details of recruiting and enlistment should be ascertained. In the absence of figures my own unhesitating conviction is that our men who have gone out to fight are, on the average, distinctly superior in innate qualities to those who have remained at home, and that the continuous process of invaliding out the weakly will have made the selection still more searching in the case of the men who will have been killed abroad.

Passing on to the second question, namely, whether death picks out the better or worse man in modern war, it is first to be noted that the qualities which induced a man to volunteer early for the war are valuable qualities, and that the earlier volunteers have obviously suffered far more than those who came later into the field. Then, again, great courage and determination unquestionably expose the possessors of these qualities to exceptional dangers. On the other hand, courage, intelligence and good physique are still elements of safety in certain circumstances, especially in hand-to-hand encounters; and on this point both to obtain the opinions of those who have been in the thick of the fighting, and to ascertain the percentage of the total wounds which were inflicted by the bayonet would be instructive. It is, however, more important to note that disease and wounds tend to pick out the weakest men when adding to the roll of death in war; though it is true that typhoid fever often attacks and kills the strongest, whilst wounds are sometimes more fatal to those in robust health than to the weakly. It is certainly now very difficult to strike a balance between all these conflicting considerations with complete assurance; but I myself can feel but little doubt that though the men who will come home from the war will be lower in the scale of human values than those who will have died abroad, yet they should rank on an average above those who will have stayed at home; in which case war is unquestionably dysgenic. It is true that wars in the past have at times raised the whole civil death-rate by imposing hardships on the population generally, and where this has been the case the total result may have been eugenic in consequence of the general weeding out of the unfit. Though no one can tell what lies before us, yet there is now so little signs of widespread and severe suffering at home that there is, at present, no reason to suppose that the foregoing conclusions as to the dysgenic effects of war will thus be falsified.

Our anticipations of racial damage will, moreover, be confirmed and strengthened if the differential death-rate amongst officers is taken into account. In the first place officers, as a rule, belong to a somewhat higher social class than the rank and file, and this probably indicates the possession of somewhat higher innate qualities, a point to be discussed later on. Then again, the selection on joining the colours is more rigid in their case than in the case of the men, especially as regards ability. On this point an estimate of the number of University men who will have gone to the war in all capacities, together with their death-rate in comparison with the average war death-rate, would be instructive; and in considering the results it should be remembered that a University career is no longer merely an indication of social class, but often implies a rigid process of examinational selection. But the main point is that if the war death-rate amongst the classes from which officers are largely taken is much above the average, and if investigations should give rise to the belief that the average officer is somewhat innately superior to the men he commands, it would follow that the racial damage to the nation from the war would be so much the more formidable.

If all these enquiries are made after the war is over, not only will it be possible to ascertain approximately the number of deaths due to the war, but we shall thus be assisted in forming some idea as to whether or to what extent the combatants formed a selected class of the community, selected that is both before and in the fight, and whether the harmful selective effects due to their slaughter will have been reversed by the deaths at home and abroad due to hardship and disease. In fact, with all this knowledge it may be possible to paint with a very broad brush a picture of the immediate racial damage to the nation resulting from the war.

(2) *To what Extent will the Immediate Damage due to the War have enduring harmful Racial Effects on the Nation?*

If the nation will be physically and mentally damaged by the war, these evil effects will certainly affect future generations because of the check thus *directly* produced on intellectual and material progress. Neither of these very important consequences, nor any possible countervailing influences, are however within the scope of my subject, for I am here only considering the extent to which this damage will be passed on to posterity by the agency of natural inheritance. Assuming that some idea of the deterioration of the adult population after the war can be obtained, it is first to be noted that for eugenic purposes the average deterioration should be calculated with the individuals weighted according to the probability of their having any further offspring, and moreover, that it is amongst those most likely to become fathers in future that war will have wrought its greatest havoc. Amongst all ranks, but especially amongst the officers, it will be the young who will have suffered most, and it is they who would have been most valuable racially to the nation. If it may be assumed, merely for the purposes of illustration, that the average height of the whole adult male population will be found to have been reduced by half an inch, it may well be that the average height of the prospective fathers will have been reduced by a full inch; because the slaughter will have been far greater amongst those who would otherwise have become parents than amongst the older and therefore less prolific men. Then as to the inheritance of this damage, we have now a considerable amount of information to guide us, notably that compiled at the Galton Laboratory under the guidance of Professor Pearson. According to his results, the parental correlation coefficient for both physical and mental qualities generally approximates to 0·5. As the standard deviation for successive generations are approximately equal, this means that the damage to the child population born immediately after the war will, on an average, be half that experienced by the parent population, or, on the above assumption, the average height of these children when grown up will be half an inch less than that of their ancestors. Not long after the war is over the undamaged portion of the population will begin to become parents in increasing numbers, and this will result in a rise in the average qualities of the community, to be followed by a further fall when the grand-children of the damaged portion of the community begin to make their appearance. To calculate the approximate probable relative influence on posterity of the damaged and the undamaged portion of the nation when these two streams will have been thoroughly intermingled will possibly not be beyond the powers of the statistician, and should it appear, for example, that these influences will have equal weight, then it would follow that the ultimate racial damage to the nation would, on the assumptions previously made, be about a quarter of the average damage to the parent population, or somewhat about half the average damage by the war to the entire adult population. Let me again repeat that the foregoing numerical conclusions are merely illustrative and entirely hypothetical, and let me not confess but assert that in certain theoretical matters I have in these remarks been skating over thin ice. All I have attempted to do is to indicate the kind of investigations which will have to be instituted after the war if the probable damage to the nation in the more distant future is to be estimated; and surely this is a branch of knowledge which it is of supreme importance that we should master. No doubt it will be a task requiring much thought and much labour. But, as the future of the nation is involved, this labour should not be grudged.

In the foregoing discussion it has been tacitly assumed that the causes of racial deterioration which are due to the war will only remain in active operation during the war; and, as this assumption is erroneous, other reasons for anticipating enduring harmful racial effects must now be considered. The birth-rate amongst the well-to-do classes, as Mr. Theodore Chambers has pointed out,[2] will be lessened as a result of the increased poverty after the war to a greater extent than amongst the poor, and this for two somewhat distinct reasons. In the first place, the very poor are, on the whole, less foreseeing than are those who are better off, this defect in their character being to a large extent the ultimate cause of their poverty; and this want of foresight will show itself in their being little influenced in all matters of conduct which depend on considerations concerning the future, such as the prospective burden of a family not yet in being. Then again the prosperous, having more to lose, will be more impressed than the poor by their losses, even though their consequent sufferings will be far less. Now if the better-off classes are as a fact on an average to any extent innately superior to the very poor, the believer in heredity must look forward to the war continuing to exercise a damaging effect on the racial qualities of the nation for a long time after hostilities have ceased, by continuing to diminish the rate of multiplication of the more fit. But this will be an evil influence which it will be almost impossible to estimate except in the roughest way; for, in order to solve this problem, it would be necessary to know both the changes in the rate of reproduction of the various strata of society, and also the relative values of the innate qualities of these different sections of the nation. The acquisition of the first of these sets of data, though certainly a task difficult enough to defy most enquirers, does not present insuperable obstacles; and it certainly is to be hoped that some systematic investigations into the birth-, marriage- and death-rates in typical groups of the community will be instituted after the war is over, a knowledge of all these rates being necessary in order to ascertain relative rates of reproduction. But it is only when pre-war figures are available with which to compare such post-war results that these later enquiries will be immediately useful. The figures obtainable from the last census when the publication has been completed will tell us much, and in any case the work already accomplished by the Galton Laboratory will be of great value. Dr. Heron's figures are certainly exceedingly disquieting, and if the Galton Laboratory repeats these investigations as nearly as possible on the same lines after the war, the best available indication will thus be obtained as to whether the prospects of racial decline will have become even more alarming as the result of the slaughter of so many of our fittest men in the war.

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[2] *Eugenics Review,* vol. vi, p. 271.

The work of the Galton Laboratory certainly throws valuable light on the relative innate qualities of the groups examined, though as regards this second half of the problem more should certainly be attempted, even though the greatest difficulties will here be encountered. The belief that all men are born equal may now be regarded as having been quite exploded, and all educated persons will agree that the innately superior types will always distinguish themselves from the rest when all are exposed to similar environmental conditions. Success at schools and colleges in every grade of society now leads to better prospects as regards wages or salaries, and those who believe not only in our educational system, but also in the ordinary scientific tenets concerning heredity, cannot deny that, to some extent at all events, the innately superior are thus being continuously selected out into the wealthier classes, whilst by a similar process the less fit are being weeded out from above and replanted below. It is true that it may be urged that the larger families of the very poor, together with the harder conditions of their lives, have produced a very high death-rate amongst all those possessing weakly constitutions, and that this has resulted in the survivors in these poorer strata possessing innate qualities superior to those with which the rich are endowed. The main difficulties in deciding which of these opposing influences has had the greatest effect in the past consists in the first place in selecting truly random samples of the different strata of society, and then in eliminating the effects of environmental influences. Many suggestions have been made, but all are open to criticism. For example, if a record could be kept of the careers of a large number of persons who had all received somewhat similar institutional educations, who had all been completely separated from home influences from a very early age, and of the social status of whose parents something was known, then the correlation between social status and innate qualities could undoubtedly be measured. But it would be exceedingly difficult to collect a sufficient number of cases fulfilling all these conditions, and the records would have to be kept for many years before reliable results were obtainable, because malleability of disposition may lead both to the winning of a high character at well-managed institutions and also to a readiness to follow evil examples when out in the world and free from restraining influences.

If we only look to persons educated in institutions we should, however, only be dealing with but a small proportion of persons connected with the richer strata of society, whilst if we turn to the upper classes in search of suitable material, other difficulties will be encountered. The number of the members of the House of Lords whose titles were created more than three generations or say ninety years ago could easily be ascertained, and these would no doubt form an all too small, though certainly a truly random, sample of the upper classes, their selection depending merely on their being the first of the litter, to use Mr. Lloyd George's elegant expression. It would also not be difficult to ascertain the mean ratio which the number of these peers bears to the total male population of similar ages of the United Kingdom. Now, if the environmental conditions had been similar, the relative percentages of the men of great ability in these two groups would have indicated, as Galton has taught us, their relative rank in regard to those innate qualities in respect of which the ability had displayed itself. But who can tell how many " mute inglorious Miltons " there may not be hidden away amongst the masses of our teeming population? Nevertheless, it might not be wholly unprofitable to enquire whether there are 20,000 persons—I confess I am making a pure guess at what the calculated ratio would prove to be—if there are as many as 20,000 persons in the United Kingdom possessing innate scientific capabilities equal to those of Lord Rayleigh, or literary abilities equal to those of Lord Rosebery, or whether we have at our disposal 60,000 persons of the average innate political capacity of Lords Crewe, Derby and Lansdowne, assuming them to be *the* three most able of the selected peers. Those who are inclined to answer these questions in the negative must be at all events ready to accept a verdict in favour of the innate superiority of the upper classes. Then again, could not the plan of measuring the percentage of very exceptional persons be applied at the other end of the mental scale, and would it not be possible to ascertain the proportion of the mentally defective in the various strata of society? The objection here raised would probably be that our uncertainty as to the causes in many cases of these mental conditions would make this a doubtful method of indicating relative innate superiority. These suggestions have, however, only been made in order to show that there are many directions in which such enquiries might be pushed, that if all the clues available were followed up, and that if the results were studied in connection with what has already been done at the Galton Laboratory, by Dr. Goring in regard to criminals, and by others, some general conclusions could be arrived at as to the relative innate qualities and rates of reproduction of the different strata of society, and some hint obtained as to the racial damage likely to result from the economic stress after the war.

(3) *In what Ways will the Racial Damage due to the War be likely to affect the Lives of Citizens generally?*

There may, perhaps, be some who will admit that it will be possible, at the expense of a vast amount of labour, to make a forecast as to the probable deterioration of the racial qualities of future generations resulting from the war, but who will yet in effect throw doubts on whether it would not be best to let posterity look after its own affairs. Our own inborn qualities being entirely unalterable, what can eugenic reform, or the attempt to improve these inborn qualities, do for us to repay us for any trouble expended on this cause, it may be asked? We can no doubt in reply point out that all who have many years to live might yet themselves benefit from the raising of the innate qualities of their neighbours consequent on eugenic reform; but this has always appeared to me to be an argument so feeble as to be harmful rather than helpful. To those whose patriotism is of such a feeble nature as to make them careless as to what happens to their country after their deaths I have nothing to say. But there are, in truth, but few whose love of country will not make them willing to make some sacrifices in order to promote national progress in the future even if they themselves will never see the results of their efforts, and few, therefore, who will not feel some interest in endeavouring to trace out the way in which the nation of the future will be advanced or retarded by a rise or a fall in the average innate qualities of its citizens. A few words on this general topic, together with a few observations as to the statistical lines of enquiry thus suggested, may, therefore, perhaps be justifiable.

The well-worn controversy concerning heredity and environment cannot here be broached, it being sufficient for my purposes to remark that if it be agreed that the adult man is the product of his past environment playing on his natural qualities, and that great diversity exists in regard to both the nature and the nurture of civilised man, it follows that it is only by attending to both these factors that our nation can be made to attain in future its highest attainable level. Whilst environment must certainly be studied in connection with crime, disease, drunkenness and pauperism, it is equally imperative that heredity should not be neglected in connection with these evils, all of which will be increased if the innate characteristics of the nation are allowed to deteriorate. And not only do these failings cause great misery to the individuals who actually fail, but they also throw a heavy burden on the community as a whole. As to the financial aspect of this burden, would it not be worth while enquiring what is the total cost falling on central and local governing bodies on account of the administration of law and justice, the police, the relief of the poor, asylums for lunatics, the mentally deficient and inebriates, sanatoria, special schools, &c., including also that portion of the national expenditure on insurance which is directly or indirectly attributable to ill-health or bad conduct ? To this ought to be added all charitable expenditure due to what is inappropriately called degeneracy, such as that on hospitals and homes of various kinds, together with the expenditure defrayed out of private incomes in consequence of the physical or moral defects of members of the families concerned or of their dependants. Many important items should be included which it would be almost impossible to estimate ; such as the general cost to the community of the increase of prices or rents consequent on the default of wastrels and drunkards, and those items of wasteful expenditure, due to folly, weakness of mind, or criminal carelessness, which result in a diminution in the national store of capital. But if the best possible estimate were to be made of all this useless or injurious annual national expenditure as it occurred before the war, we should certainly thus acquire some knowledge of the aggregate total of all the different items inevitably to be increased if the war does injuriously affect the racial qualities of the nation, and we should thus be better able than at present to appreciate the importance of attempting to minimise this anticipated coming damage to the nation.

One other way in which inefficient workmen injure their more efficient neighbours is perhaps worth mentioning. Where wages are paid by the day, and where the amount of work done by each individual is limited by rule or custom, the total output is, to a large extent, dependent on the capacities of the least efficient workmen engaged for the work. This is also in a measure true where piece-work obtains, because the piece-work rates vary in the long run more or less in proportion to the nominal rate of day wages. If it were possible to estimate how much the output of goods would be increased if each worker did as much as he or she felt capable of doing with comfort and efficiency, we should thus ascertain the magnitude of the stream of goods and services which might be made available for general distribution under a different system, and of which the working classes would inevitably get their share in the long run. The point here urged is, however, that these considerations point to another way in which a fall in average innate capacity will, in the long run, be certain to hit all classes of the community by diminishing their wages, salaries or incomes. For if such a fall in average quality takes place, it must be remembered that the number of marriages between the unfit will be increased and that consequently the number of those with, as it were, a double dose of unfitness in their compositions will be increased, with the result that there will be an actual fall in the capacity of the lowest strata of society.

By enquiries conducted on the foregoing lines it would, however, only be possible to paint one half of the picture ; for the effect of a decrease in the percentage of the higher types has to be considered just as much as that resulting from an increase in the percentage of undesirables. It requires, I believe, some personal knowledge of industry to fully realise how dependent a country is for its material prosperity on the capacity of all those who hold positions of authority of different kinds, and who form a large but carefully selected class of the community. Then again, the moral, intellectual and artistic well-being of a country is a slow growth, dependent on the energy and genius of a few leaders backed by a comparatively small body of able lieutenants. Realising these facts we see how this war may not only increase the burden falling on the fit because of the presence of the unfit, but how it may also cause an incalculable damage to the whole world by diminishing the number of those capable of acting as leaders in the struggle for progress and by thus checking the advance of mankind in all directions. It is only by such studies as these that the true patriot will fully realise the call made on him to take part in the fight against racial degeneracy and for racial progress.

(4) *How can the Racial Damage resulting from the War be best Repaired?*

Though most eugenists would predict with considerable confidence that if the enquiries here suggested should come to be made after the war is over, the result would be to indicate that great racial harm will have been done by the slaughter of the fit, yet few would now venture to predict how great that damage will be. There is, however, no reason why we should not at once consider what will be the best methods of mitigating these evil consequences, an enquiry which in fact covers the whole field of eugenics, a subject too vast to be discussed here to-day. The aim of the eugenist is to increase the rate of multiplication of the more fit, and to decrease that of the less fit; and as the attempt to attain either of these ends involves the consideration of many moral, legal and social questions, the field to be covered is very wide. Only two or three remarks on certain topics closely connected with the war will here be made.

As to the possibility of increasing the numbers of the more fit, it should be remembered that all those born between, say, 1896 and 1914, form a section of the community undamaged by the war, and that the proportion of this section who will be numbered amongst the parents of the coming generation will increase from now onwards. It will, therefore, be increasingly necessary for the next twenty years to inculcate a widespread belief that, when both parents are fairly healthy, it is both immoral and unpatriotic to limit the size of the family except with reference to two reasons for such limitation, namely, that the probable income of the family must be such that the children can be brought up in comfort but not necessarily in luxury, and in the second place that there should be a fairly wide interval between births. But if there will be a rise for some years after the war is over in the average quality of parents, it follows that that average will be at its very lowest when peace is declared. Whatever can be done to check the multiplication of the unfit should, therefore, then be pressed forward as quickly as possible, for at no period of our future history will the need for such measures be likely to be greater.

Though the eugenic questions which affect the nation as a whole are far more important than those which only affect the fighting forces, yet these latter should not be neglected. If our sailors and soldiers are, as I believe, a selected class of the community, all circumstances which affect their rate of reproduction, such as the supply of married quarters, or the sterilising effects on them of venereal diseases, have a definite eugenic bearing. Then again the authorities responsible for the awards of pensions to disabled combatants have power to take into account the number of their children born previously to the war. But from the eugenic standpoint the number of children likely to be born in future is far more important, and it is much to be hoped that permission will be given to take them into account also. These examples are, however, merely mentioned here to show that there is another set of eugenic problems connected with war which ought not to be overlooked.

Conclusion.

The following propositions, though in some respects still disputable, would, I feel sure, receive very general support from the leaders of scientific thought:—(1) The welfare of a nation depends immediately on the use it makes of its environment. (2) The use a nation can make of its environment is strictly limited by, and is ultimately dependent upon, the inborn qualities of the individuals composing it. (3) And, lastly, the improvement of its environment by a nation does not directly lead to any improvement in the inborn characteristics of future generations. Now, if it be true—and of this there seems to me but little doubt—that this great war will greatly damage the nation, then if these propositions are accepted as valid, it follows that the inborn qualities of future generations depend in some measure on the extent of this immediate damage. And if the future of the nation for an indefinite period is in question, surely it would not be unreasonable to demand that this great problem should be examined by a Royal Commission when peace gives more leisure. The memory of what has often occurred in the past, however, rather damps one's ardour in demanding such an investigation; for where differences of opinion have existed it seems to have been considered necessary that opposing factions should be strongly and nearly equally represented on Royal Commissions, with the result that time has been wasted and half-hearted conclusions reached. The political element has, moreover, generally been present in great force, which has materially lessened the chances of effective reforms being suggested; for, if I may rely on the impressions left on my mind by a brief period of close contact with the political world, though politicians are very honest when they do express their convictions, yet, not only are they often made silent, but their views are frequently actually modified by their incurable cowardice as regards public opinion. The fear of the voter becomes a part of the very marrow of their bones. A purely expert committee would be far more likely than a Royal Commission to produce useful results in connection with such a controversial subject as is here suggested, and, moreover, this method of investigation would perhaps be held to be less dangerous by our political masters as being less compromising to them. The work of a small and well-chosen committee might be of great value in helping to convince the public that some action should be taken, in which case the Government might possibly follow in its wake. In conclusion I must, however, confess that I cannot but regard this matter as part of the whole great question of racial advance or decline on which the fate of nations so largely depends; and that I am actuated by the fear that in the excitement of party strife all eugenic reform will be pushed on one side to make room for topics of more immediate interest, in which case there will be grave danger of our country slowly drifting down the hill of racial degradation and of never again occupying its past high position in the councils of the world.

DISCUSSION ON MAJOR L. DARWIN'S PAPER.

DR. GREENWOOD said he had very great pleasure in rising to propose a vote of thanks to Major Darwin, whose name had been so long associated with the defence of Eugenic ideals. He was sure everyone present would agree that the subject was a very opportune one, and that Major Darwin had given them an extremely thoughtful and suggestive account of matters which they needed to take into consideration at the present time. He thought he might divide the Paper into a proposal for a certain inquiry, a forecast of the results which might possibly follow that inquiry, and finally a suggestion as to practical action which might be taken, assuming that the results of the inquiry came out as suggested. He first of all wished to make one or two comments with regard to the inferences to be drawn. Major Darwin's general conclusion that the fighting forces represented the fitter elements of the population must be one that they would all endorse, if only for the fact of the physical weeding out of the unfit, even if it were true that the examination of recruits was a very much more cursory matter than in ordinary times. There was at any rate some degree of selection; and as there could be very little doubt that there was a considerable correlation between physical and mental characters, he thought they might deduce from that, that not only on the average would the physically selected tend also to be to some extent mentally selected, but that those conditions were fulfilled in the case of the fighting forces. One or two points arose which they perhaps might call in question. With regard to the arithmetic which Major Darwin gave as an illustration on p. 166, it was only fair to bear in mind that the exact significance of some of those correlations of p. 168 had never been clear to some of them, and was not becoming clearer as time went on, owing to the fact that, particularly with regard to Professor Pearson's measurements of mental characters, as had been pointed out by Mr. Yule and other statisticians, the final arithmetical results depended on radically different methods of computation; and their agreement could not, in his opinion, be regarded as a very important sociological fact. Further, the question of inheritance was rendered more complex by the probable existence of selective mating, with the result that, as Major Darwin pointed out in his conclusion, any valid prediction of the effects to be manifest in later generations must involve a great deal of difficult analysis. On the question of the actual net damage which was sustained owing to the men killed in the war, and dying of disease, Major Darwin had expressed his views clearly. The physically abler, and to some extent the mentally abler, members of the community at the commencement of the war were exposed to risk. Then, a certain number of those who never came back again would not do so owing to their having been physically less fit than their fellows, and having been weeded out by disease. But, as Major Darwin pointed out, any selection of that kind was much less intense in the present war than in other wars, owing to the fact that disease, at any rate in the Western campaign, was of considerably less importance relatively to deaths by shot and shell than it had been in any previous campaign ; consequently the main cause of destruction was due to shot and shell, direct warlike operations. Major Darwin suggested that the more courageous and physically fitter might possibly be more liable to be slain in that way, and pointed out that the proportion of deaths among the officers was higher, and on the average the latter might represent a somewhat abler section of the community. All those speculations seemed to him perfectly reasonable ; but they had to bear in mind a certain set-off from the national point of view. To begin with, it was perhaps an irony of fate that it took a great war to convince a nation that in the ordinary way the vast majority of the persons composing it were improperly fed, but still when war came the nation was convinced. The result was that probably the very large majority of men composing the fighting forces were more adequately nourished, and were leading a more healthy life than they did in normal times. Consequently, not by effecting any alteration in germinal character, but by using the material which existed in such a way that its physiological powers were more likely to be raised to their proper potentialities, it might be that the better physique of the troops, the majority of whom would, after all, even in the most desperate circumstances, return, might produce some set-off against the tendency to weed out the fitter elements. Another point to be remembered was, he thought, perhaps an instance of a mental side of the same process. One had to remember that in the enormous majority of occupations in ordinary civil life, the very large majority of persons participating in them might or might not be " mute inglorious " Miltons, and so on, but unless their abilities were of a very exceptional character, they had not much chance of making their capabilities known to the nation. In the case of a war of this magnitude, there were introduced many thousands of young men between the ages of 18 and 30, who had been given temporary commissions. They had come from offices, shops, and so forth, and a considerable number of them had now been placed in positions in which they had a chance of showing whether they possessed any specially desirable characters, determination, power of initiative, and so on. In other words, they had given chances to very large numbers of people who in ordinary times would never have been in a position to show whether they possessed any particular mental or moral abilities. Further, those qualities were more easily to be tested in the case of the younger men than in the case of their seniors, because the junior officers would necessarily be put in positions in which the absence of great technical knowledge, which could only be acquired by long experience, would not handicap them so very greatly. The ultimate point to which he had rather blunderingly come was, that the war would present an opportunity to the nation to take stock of its young men, and possibly to use them more adequately than they had been used in the past, and that fact might be some set-off against the loss owing to the destruction on selectional lines which Major Darwin had referred to. He thought that those two possible sets off, and possible hopes for the future, had not been noted in the Paper. He thought that gave point to the criticism which he would have been disposed to pass on Major Darwin's observations on p. 169. It seemed to him the question of whether it might not be wholly unprofitable to inquire whether there were 20,000 persons in the United Kingdom possessing innate scientific capabilities equal to those of Lord Rayleigh, or political abilities equal to those of Lord Rosebery, was purely academic, for the reason that their only way of measuring innate abilities was achievements, and the environment and general possibility of turning innate capabilities into positive achievements were clearly much greater in the case of members of families in the House of Lords than they were in the case of members of the family of a costermonger, for example. It, therefore, seemed to him that that kind of comparison would probably not lead to any very satisfactory result. The next point he wished to call attention to showed the enormous practical difficulty of a question so very glibly talked about. They had heard a great number of people talk about racial suicide, and condemning the limitation of families. Bishops, Presidents of the United States, and other well-meaning persons, were the people who generally talked most glibly about that. He wished to call their attention to the way in which Major Darwin put the facts as he believed them to be, and the way in which scientific necessity compelled him very carefully to limit what could really be said with regard to reproduction, in such a way as almost necessarily to render any advice that could be given *ex cathedra* practically worthless. Most people started by saying it was immoral and unpatriotic to limit the size of the family. If they were able to say that without qualification, then it was conceivable some effect might be produced. But, as Major Darwin had admitted, they could not say that without qualification, and Major Darwin went on to give reasons for qualifying the general statement; namely, that the probable income of the family must be such that the children could be brought up in comfort, not necessarily in luxury, and, in the second place, that there should be a fairly wide interval between births. That qualification, which he (Dr. Greenwood) endorsed, rendered the *ex cathedra* advice for practical purposes worthless; because, who was to decide what was the standard which differentiated comfort from luxury, and who again was to decide in each individual case what, for the health of the individual parent, might or might not be a proper interval between births? In other words, as so many of them had concluded before, it was necessary to leave the decision of this matter to the individual consciences of the persons concerned; and any attempt to lay down the law in any wide way, as had been attempted by some publicists, could only lead to futility or disaster. Those were some of the points suggested by Major Darwin's Paper. Personally he shared very fully Major Darwin's hesitation as to the good results which were likely to flow from anything in the nature of a Royal Commission having any political complexion ; he strongly believed that anything in the nature of eugenic reform in the future would come entirely from the very gradual education of public opinion. It seemed to him that anything like serious and strenuous Governmental interference with the breeding habits of the nation on the lines which had been suggested by some connected with the eugenic movement, would probably be a great evil ; but such interference was so unlikely ever to come about in their generation, that they need hardly discuss it. It might, of course, be that the public of this country were so satisfied with the way in which the Government had carried out business which had been admitted by everyone to be entirely within its sphere, that they would welcome the extension of the sphere of the Government to matters which up to the present had not been within it. He, personally, had some doubt as to whether that would be the general feeling, and he felt quite sure that it was simply along educational lines such as had been advocated for many years by Major Darwin, and not by angrily scolding the public, that they might hope for future eugenic reform. He begged to move a hearty vote of thanks to Major Darwin.

Dr. E. C. Snow, in seconding the vote of thanks, thought it was appropriate to recall that probably the earliest paper of a statistical character dealing with a definitely eugenic problem was communicated to that Society by Major Darwin's brother about 40 years ago. In recent years, that paper by Sir George Darwin on "The Marriage "of First Cousins" had been very frequently referred to. One of the most interesting problems suggested by the present Paper was, in his opinion, that of the means available for gauging the physical fitness of the population after the war. Major Darwin had referred to the records provided by athletic meetings, but he did not feel very hopeful of getting satisfactory data in that way. He thought, however, that the statistics collected by the Registrar-General and the National Health Insurance Commissioners would provide a basis for statisticians to work upon. It would be quite possible to consider the population in separate age groups, say, those now 15–20, 20–25, 25–30, &c., and to ascertain approximately what proportion of the population in each of these groups had actually been on active service. The group now 20–25 probably supplied the greatest proportion of fighting men, and it would be quite possible to ascertain for each group the numbers killed and disabled in various degrees. Then, by following the various groups year by year for a long period after the war and tabulating the death and sickness rates, it should not be beyond the power of statisticians to indicate the extent to which the physical fitness of the fighting population was affected by the war. A further important point touched upon by Major

Darwin was that war diminished the number of persons capable of being active leaders in various directions. As Dr. Greenwood had pointed out, by increasing opportunity war in certain directions increased the number of leaders, but he (Dr. Snow) was disposed to think that the loss of born leaders was not compensated by the leaders produced through the opportunities provided by wars. Suppose this war had occurred 30 years earlier; on the one side Hertz would most probably have been fighting, and on the other side, very possibly, Sir Oliver Lodge, and if they had fared no better than young scientists in this war the death of each would have been probable. Under those circumstances he ventured to say that the history of the twentieth century would have been radically altered. If wireless telegraphy had been discovered at all, it would, at any rate, have been greatly delayed. He knew that some would claim that wireless telegraphy was the product of the age and not of the man, but the history of our own Royal Society showed that important principles not published at the time of discovery might lie 60 years before rediscovery. It was by no means fantastical to suggest that had the war occurred 30 years ago the development of science would have been greatly delayed. Young physicists had been killed in this war whose reputations were little below those of Hertz and Lodge as young men, and who could measure the loss to the world's progress by the early death of these? Another point he wished to refer to was that emphasised by Major Darwin as the aim of the eugenist, viz., to increase the rate of production of the most fit. Dr. Greenwood had advocated educational methods in this connection, and it was the opinion of many that the adoption of other means would involve undue interference with individual liberty. There was one important fact, however, which must have struck everyone who had examined the population statistics of the various parts of the British Empire. In the United Kingdom there were about 500,000 fewer men of military age than women of the same age. In the self-governing Dominions there were, at the same ages, about 350,000 more men, while the proportion of married men was extremely low. Nobody would suggest that the Australians, Canadians and New Zealanders now fighting by the side of our own men were not as fit a body of men as could be found anywhere, yet it was a melancholy fact that a large proportion were single solely owing to the scarcity of women in the Dominions. On the other hand, in this country a large number of women must necessarily remain unmarried owing to the shortage of men. Of 100 women selected at random at age 16 here, as many as 23 would still be unmarried on attaining age 45, but the chance of marriage in Australia was much higher. The danger was that at present the 23 women referred to could earn a satisfactory livelihood in this country, and, therefore, their thoughts were probably little directed to the Dominions. From the imperialistic standpoint, however, it was far better that these women should be wives in Australia and Canada rather than wage-earners in the textile and similar industries in Great Britain, and it should not be beyond the powers of statesmen to ensure that the flow of female emigrants from our shores was maintained approximately at the same figure as that of males. He felt that eugenists would be doing good service if they could direct attention to the need for a more uniform distribution of the sexes throughout the British Empire.

Dr. CHALMERS MITCHELL said he did not propose to detain them longer than two minutes, but wished to say that as he had listened to the extraordinarily interesting Paper by Major Leonard Darwin, and to the comments which had been made by subsequent speakers, he became more and more convinced that there was no single proposition in the Paper the exact opposite of which could not be supported upon equal grounds by an equal number of people. He was sure Major Darwin had been very cautious about the way he had put them; but all the questions were of the vaguest possible kind. They were all questions of "I believe," or "it may be," or "it is "possible," or "this view may be taken," or "that view may be "taken." It, therefore, seemed to him that if the results of the war on population were going to be dealt with satisfactorily, they ought to be dealt with without any questions of that kind being put before any Commission or Committee that might be appointed. Useful statistics, as the second speaker had said, ought to be entirely uncoloured in every possible way, without any prepossession towards doing good by eugenics or correcting possible evils, or without any opinion as to whether the war was going to do good or evil. They did not know that. That was what they wanted to find out. He hoped the Royal Statistical Society would lend all its weight to an inquiry being made, but the lines of that inquiry being stated in the hardest and driest possible way. The kind of lines which seemed to him to be most useful would be, to divide the male population as it now existed into two groups, taking only those of military age. The first group would be those who had gone upon combatant service, and the second group those who had stayed at home. They wanted to compare the death-rate of those two groups during the war, with the normal death-rates. Then they wanted to compare the death-rate in those two groups during the period of ten years after the war, and then possibly a period of five years after that, with each other; because it might well be the case, that although at the present time there was a difference in the death-rate between those who had stayed at home and those who had gone to the war, that difference might be neutralised in a period of five or ten years. One need not go into all the reasons; but it was quite obvious that the people who came back from the war would be in an enormously better position than those who had stayed at home. They would be encouraged in every possible way, and get the best places. Any employer who had to choose between a person who had come back from fighting, and a person who had stayed at home, would choose the person who had come back from fighting. That would happen in the Universities and Professions, and in business; and it might quite possibly be found that any difference in the death-rate between those who had gone and those who had stayed at home, would soon be equalised. This was one of the first things to be sought out. Then again, they had to compare the marriage-rate of those two groups during the war and for ten years after the war, because all the same differences came in. They all knew that a very large number of people who had gone out to the war had married, who would not have married so soon if they had not joined the army. They would have to see the incidence of the marriage-rate in the two groups during the war, and for ten years after the war. Next, they had to take the birth-rate in the same way for the two groups, and not only during the war, but ten years after the war. Lastly, and the most important perhaps, they had to take the infant mortality rate of the progeny of those two groups before the war, during the war, and for the periods of five and ten years after the war. It was only by very strict uncoloured scientific scrutiny of blocks of statistics of that kind, that it seemed to him they would get any further forward. All the extremely interesting theoretical stuff which all of those who wrote and thought about evolution loved writing about and discussing, was only for writing about and discussing, and for no practical purpose at all. What the Statistical Society wanted to get was hard uncoloured facts; and, when they had got those turned loose on them, they could draw their own conclusions. It would be a simple solution of the difficulty of obtaining the facts, if it were arranged that all registration forms of marriages, deaths and infant-deaths were printed in two colours—say, white and green, and the registrars instructed to make every entry relating to a combatant, on say white paper forms, relating to non-combatants on green forms.

Dr. SALEEBY said he wished to refer to a few points in the extremely interesting Paper they had listened to. Major Darwin had not mentioned, nor had anyone who had followed him, a fact of supreme importance; namely, that military selection did not concern the women of a nation, who were by no means the least important of the two parents. Possibly the historic effects of war were very much less than they would otherwise have been, for the reason that only one sex was subjected to the selection of war. It was highly proper to discuss the comparative dysgenic effects, as he called them, of the different methods of recruiting an army. He thought Major Darwin had definitely implied that the voluntary system must be more dysgenic than the compulsory. Similarly it was well worth discussing how the principle of taking bachelors compared with an indiscriminate system, or a system perhaps of taking married men. He supposed the statistical evidence was clearer now than it was forty years ago, when Herbert Spencer referred to it in connection with some of M. Bertillon's assertions, that married men have a superior longevity, and are, as a matter of fact, the superior members of the community statistically. Hence, the compulsory taking of bachelors first might be regarded as a somewhat less dysgenic measure, assuming the men taken were as fit to win the war. Similarly he thought very much more stress might be laid on the question of the ages at which the men were taken. He thought their practice in this country was directly the reverse of that in at least one of the countries of their enemies, where apparently a definite principle had been followed of using up the older men first. It was vastly more economical if that were so, from the racial point of view; because the issue was precisely as Major Darwin had clearly put it, namely, the number of children the lost soldiers would have had, and the number of children they did have. If they took a man of 40 or 45, whose reproductive career was practically or entirely finished, it was of no racial significance at all. He reminded the audience of the words of Major Darwin's own father, in *The Descent of Man*, as bearing on the contrast between voluntary and compulsory methods of selection. There was another question to which he thought Major Darwin had not referred; namely, to what extent the factors for which men were accepted or rejected by the military authorities were really genetic, and therefore of eugenic significance. It was surely not enough to talk about fitness and unfitness generally. But was it not necessary to be very precise in taking up a question of, say, shortness of vision, or flat feet, or heart disease, to see how those were treated by the military authorities, what was their genetic origin, if *any*, and what would the effect be upon posterity in respect of those precise things studied? For instance, was a nation going to become more short-sighted, and would it be of national importance if short-sighted men were largely rejected? On that he thought they were bound to say that looking at what the medical officer actually did, a very large number of the things for which men were rejected, and therefore, as it were, left at home to breed their like as being "unfit" men, were not of genetic significance. They were acquisitions. These acquirements had no germinal origin, and no racial significance—flat foot, rickets, and many other diseases or defects with no racial significance at all comprised a very large proportion of the rejected men. Only in so far as the factors of acceptance and rejection were genetic was the racial significance of the war to be considered. Eugenists innocent of pathology and especially of etiology continually erred in this respect. With regard to the way in which they might perhaps limit the racial damage—which, notwithstanding what Dr. Chalmers Mitchell said, he thought they might as a statistical generalisation assume—a few points were worthy of noting. They must try to cut down the military death-rate. Thus, they must push with all the force they could the utility of such methods as the anti-typhoid inoculation, which saved such an enormous number of men, and which fanatics fought against; and try, so far as they could, to persuade men to be inoculated. The latest figures he had obtained from the War Office last month were 31 to 1, as regards death ratio, in favour of the inoculated men In so far as they pushed that, so would they cut down the military death-rate, and presumably the dysgenic significance of the war. Similarly they ought to fight in every way against venereal diseases, to which Major Darwin's father referred in *The Descent of Man*.

Thus, they should discourage the use of alcohol, which notoriously had always played into the hands of venereal disease. Then they ought to care particularly for the infants of the soldiers, as being *ex hypothesi* the superior class of infant now with them. The nation was apparently recognising that in its high allowance for the wives and children of soldiers—a higher allowance than they had ever made before, or any other nation had made—but whether that allowance was entirely spent in what he called "saving the future," or in many instances was spent on killing the future through maternal alcoholism was another question. They had the appalling fact that, notwithstanding the tremendously increasing quantity of money spent on infants last year, there had been a rise in the infant mortality, without any climatic excuse in the third quarter of the year. He was very glad to hear Dr. Snow talk about the disproportion of the two sexes in different parts of the Empire, a matter to which he had been trying to call attention since 1908.

Mr. T. T. S. de Jastrzebski said he did not propose to skate over the very thin ice which Major Darwin had skated over, nor would he follow Dr. Snow in his romantic career. He would very much like to do so, but he wanted to say two or three words on what seemed to him the most practical aspect of the Paper, at any rate, the one which concerned his own Department, that of the Registrar-General, directly. That was, how far the publications of that Department would assist in the matter. There was no doubt whatever that this would probably be the soundest, and at any rate the one unchallengeable basis upon which one could proceed to investigate some of the results of the war. But he was afraid that to do anything in the directions which Dr. Chalmers Mitchell suggested, was practically impossible. As far as he could see, they could not cut off the community into two sections—those who went to the front, and those who did not. He did not know what type of legislation they would have to introduce in order to obtain, in the death, birth and marriage records, some such item of information as :—"Served "at the front during the great war," or "Served at home; he "did not go to the front during the great war," or "Did not serve "during the great war." In order to get anything in the way of effective comparison they would have to have that, and the present machinery did not admit of anything of that kind being done. His own Department was very keenly alive to these questions and the value and importance of them. So far as the Registrar-General and his colleagues were concerned, whatever could be done would be done; but he was not at all convinced that even on that they could build a particularly stable structure. The one practical point which he wished to bring before the Society was, that the first necessity in that direction would be to expedite the taking of the next Census. They must remember at the present moment they were in the year 1916, and were beginning to feel that their vital statistics were not based on solid ground. The age constitution of the population of the country had been materially changed by the war, and they had no means of ascertaining to what extent those changes had taken place, or to what extent internal migration had affected the various administrative areas of the country. For 1915 they were estimating the civil population, based on the results of the National Register taken in August, 1915, because it was perfectly obvious that any ordinary methods of estimating the population were worse than useless under the disturbing conditions of the present time. But since the National Register was taken, great changes had taken place in the constitution of the population, and by the middle of 1916 they might be as far off as ever from knowing what was the actual population of the country, and how it was made up as regarded its age groups. It, therefore, seemed to him that the first necessity, if their vital statistics were to have any real value at all, was to have a Census after the war was over, immediately after the armed forces of the Crown had returned to their various homes. He wished, as emphatically as he possibly could, to entreat those members of the Society who had so much influence, to bring that point home as far as they possibly could, because personally he was convinced that the whole value of any statistical work that they could do after the war was over, would depend on their being able to base it on something resembling accurate data on which to work.

The CHAIRMAN (The Right Hon. Lord GEORGE HAMILTON) said it seemed to him that some of the recent speakers had a little missed what he understood to be the purport of the Paper. The purport of the Paper, to use the writer's own words, was to suggest means by which after the war was over they could rehabilitate the racial and physical fabric of the country, and that the racial and physical fabric of the country would have suffered terribly by the war was absolutely indisputable. But most of the speakers had wandered off into controversial subjects in connection with eugenics, which he thought need not necessarily take a too prominent part in the suggestion that there should be an inquiry for the purpose which Major Darwin had suggested. He asked what were the almost indisputable facts with which they had to deal. He thought one of the cleverest parts of the Paper was, that although it was a statistical Paper there was not a statistic in it after the first four or five sentences. He had taken what trouble he could, though, of course, his figures were hypothetical, but he believed it was no exaggeration to say that nearly ten million casualties had occurred amongst the armies of the combatant nations up to the present moment. That was independent of the number of persons who had died in hospital from sickness, and independent of the male mortality amongst the non-belligerent populations of the countries which had been occupied by Germany. Those were appalling figures. But what seemed to him the worst part of that awful slaughter and mutilation of human beings, was the methods by which it had been accomplished. No doubt, as the different medical gentlemen who had preceded him had pointed out, science had done much, both medically and surgically to alleviate the sufferings of those who had been wounded, and to effect cures which had hitherto been thought hardly possible. On the other hand, science had developed to a far greater extent its devilish ingenuity in slaughtering and mutilating human beings. What was going on at the present time was, there were two lines, one he thought 500 miles long and the other 1,000 miles long, and there could not be less than 8 to 10 million human beings, taking each nationality, who were engaged in trench fighting. Trench fighting consisted not of hand-fighting, which, of course, occurred from time to time : but consisted of each side endeavouring by mechanical devices and by chemistry to drive as many of the other side as it could out of their senses by perpetual bombardment and by other devilish devices. In his own experience he knew of a number of cases, and medical men must know many more, where persons who had been subjected to that ordeal had had their nerves permanently shattered. The number of blind and deaf was far greater than it was ever before. Would not that have a very serious effect on future generations ?

Dr. Chalmers Mitchell said there was no evidence.

The Chairman, continuing, said he did not say evidence, but they had to wait until they knew. Somebody might perhaps take the exactly reverse view to what he did, but that was rather a supposition that it would not have a bad effect on future generations. What he would have thought was the advantage of the proposal Major Darwin made was that if they had a small Committee, which he admitted would have to be very carefully selected, they might lay down a number of negative propositions to which every medical man in the room would agree, as to the inadvisability of certain marriages of consanguinity and hereditary failings and defects of two families, and try to prevent marriages of that kind, and might in a number of cases do a great deal of good in that direction by warning young people, who were always excessively careless and indifferent of those considerations as to the unwisdom of contracting marriages of that kind. He quite agreed there were a number of problems of quite a different character which had been alluded to by one of the previous speakers. The superabundance of women would be a problem. As he dared say the gentlemen who had alluded to it remembered, after the Thirty Years War in certain parts of Germany polygamy was allowed by a Bull of the Pope. He did not suppose they would come to that here, but he thought Dr. Snow had made rather a practical suggestion, which he would like to see carried out. Dr. Snow had pointed out that the great mass of Colonials who came over were unmarried, and it was estimated that the number of men who would be sent would be something like 850,000. He would like very much to see every shipload of their kinsmen from over the sea have a similar shipload of ladies from this country sent out with them to be mated with them. He supposed that would be a little beyond the powers of any Committee which dealt with it. But speaking seriously those were the class of remedies one would like to see promulgated. There were small movements of that kind in operation at the present moment, and one might hope that they might receive an impetus after the war. He thought Major Darwin had read to them a very interesting Paper, and as those who had listened to it would know, he not only bore a most distinguished hereditary name, but he had something to justify that name by the exceptional ability and power of exposition he had himself shown, so that even those who did not agree with him were very much obliged to him for his kindness in preparing the Paper and reading it before them.

Major DARWIN, in reply, said :—In the first place, as Lord George Hamilton had mentioned, he had given few statistical results in his Paper ; for he had determined when coming before the Royal Statistical Society not to attempt to teach that Society statistical methods. What he wanted was that that Society, or some other body, should, as Dr. Chalmers Mitchell had said, search for hard facts. He failed to see how Dr. Chalmers Mitchell's methods would actually get at those hard facts ; because, if he understood him aright, it would necessitate a recognition of those who had been at the war, and those who had not been at the war, and a comparison between those different classes for many years afterwards. He thought Mr. Jastrzebski's answer on that point was complete ; for it seemed to him that a system of that sort was impracticable for the purpose of arriving at definite conclusions. He found himself in disagreement with Dr. Chalmers Mitchell, because he was far more hopeful as to what was possible with regard to eugenics in the future ; for at the beginning of almost every reform it had been possible to advance arguments in opposition, very much the same as those suggested. He thought in all these matters they must risk a little and go ahead, even if the ground on which they stood was not absolutely firm. Dr Greenwood had begun his interesting remarks by casting doubts on the value of correlation coefficients as a basis on which they could work. He could not help thinking that more would be known on that subject before very long, and he hoped Dr. Snow would agree with him that the statistical results he had mentioned would be confirmed to a certain extent by the theoretical examination of Mendelian methods. But he had been careful to say in some matters he had been skating over rather thin ice. As to the effect of good feeding of troops, and of the opportunity in war for young men of ability to come to the front, he hoped that that would have a eugenic effect, which he confessed he had not foreseen ; but if so that eugenic effect would depend entirely on the good feeding of the troops making them more likely to marry and have progeny than would otherwise have been the case. Did not this argument depend on the assumption that war, putting aside killing, was actually a healthy occupation ? As to the young men of ability being picked out by the war for responsible positions, he was doubtful whether it would have a eugenic effect. Unfortunately, picking out men, and placing them in a social position different to that to which they had been used, often acted in a contrary direction to what one would wish ;

because it made them less likely to marry. As to the limitation of families, he agreed with Dr. Greenwood, that they must allow people to judge such questions largely by their own individual consciences ; but this did not seem to him in the least to militate against the idea that education might be a most powerful factor in eugenics. If they attempted education, they must lay down certain rules as the basis of that education. It, therefore, seemed to him that they should urge the views he had suggested as keenly as possible in the hope that it would have an educational effect on the great mass of the people of the country. He thought Dr. Snow's suggestion as to measuring the damage to the race by sickness statistics was an interesting one, and he hoped he would press it forward. He could not help fearing that difficulties would arise on account of the methods of measuring sickness, which as far as he could judge, seemed to vary so rapidly from time to time. If that difficulty could be got over he thought very valuable results ought to be obtainable by that method. He heartily agreed with what Dr. Snow said with reference to emigration, and that something ought to be done even if only from the eugenic standpoint on that question. But he himself thought that there were many other ways in which they could help to stimulate the production of the more fit even by Government action ; as, for instance, by attending to the income tax question. Income tax fell unduly heavily on men with large families, as compared with those with small families, and the economic effects of such reforms would have some eugenic results. He thoroughly agreed with what Dr. Snow said about the damage through the loss of eminent men. He was afraid the war would retard the progress of the world, entirely apart from eugenics, for many a century to come. He did not emphasise that point, because it happened to be outside the scope of his subject. He, however, felt very strongly the terrible damage that would be done, and the terrible burden of guilt which lay on the nation which brought about this war. Referring to Dr. Saleeby's remarks, he had said in his Paper that there were many other eugenic questions closely connected with the military topics, which ought to be considered, but which he had had no time to mention. He was very much obliged to Dr. Saleeby for alluding to some of those points, which were all of great interest, and all of which ought to be more carefully considered. He thanked the Society most sincerely for the careful attention given to the Paper.

A vote of thanks was unanimously passed to the author.

The following candidate was elected a Fellow of the Society :—

John Armstrong Read.

PRICES OF COMMODITIES IN 1915.

By SIR GEORGE PAISH, *Joint Editor of the "Statist."*

(In continuation of Mr. A. Sauerbeck's figures.)

THE following table shows the course of prices of forty-five commodities during the last twenty years as compared with the standard period of eleven years, 1867-77, which in the aggregate is equivalent to the average of the twenty-five years 1853-77 (see the *Journal*, 1886, pp. 592 and 648, and 1893, pp. 220 and 247):—

Summary of Index Numbers. Groups of Articles, 1867-77 = 100.

	Vegetable Food (Corn, &c.).	Animal Food (Meat, &c.).	Sugar, Coffee, and Tea.	Total Food.	Minerals.	Textiles.	Sundry Materials.	Total Materials	Grand Total.	Silver.*	Wheat Harvest.†	Average Price of Consols.‡ £	Average Bank of England Rate.‡ Per cent.
1873	106	109	106	107	141	103	106	114	111	97·4	80	$92\frac{1}{2}$	4·750
1896	53	73	59	62	63	54	63	60	61	50·5	112	$110\frac{3}{4}$	2·483
'97	60	79	52	65	66	51	62	59	62	45·3	97	$112\frac{13}{32}$	2·638
'98	67	77	51	68	70	51	63	61	64	44·3	116	$110\frac{15}{16}$	3·242
'99	60	79	53	65	92	58	65	70	68	45·1	109	$106\frac{7}{8}$	3·754
1900	62	85	54	69	108	66	71	80	75	46·4	95	$99\frac{5}{8}$	3·958
1901	62	85	46	67	89	60	71	72	70	44·7	103	$94\frac{1}{4}$	3·721
'02	63	87	41	67	82	61	71	71	69	39·6	110	$94\frac{3}{8}$	3·329
'03	62	84	44	66	82	66	69	72	69	40·7	101	$90\frac{3}{4}$	3·750
'04	63	83	50	68	81	71	67	72	70	43·4	90	$88\frac{1}{4}$	3·292
'05	63	87	52	69	87	72	68	75	72	45·7	110	$89\frac{13}{16}$	3·008
1906	62	89	46	69	101	80	74	83	77	50·7	112	$88\frac{5}{16}$	4·267
'07	69	88	48	72	107	77	78	86	80	49·6	113	$84\frac{1}{8}$	4·925
'08	70	89	48	72	89	62	73	74	73	40·1	108	$86\frac{1}{16}$	3·013
'09	71	89	50	73	86	64	76	75	74	38·9	113	$83\frac{7}{8}$	3·083
'10	65	96	54	74	89	73	81	81	78	40·5	102	$81\frac{3}{32}$	3·725
1911	70	90	61	75	93	76	81	83	80	40·4	110	$79\frac{5}{16}$	3·467
'12	78	96	62	81	110	76	82	88	85	46·1	97	$76\frac{5}{32}$	3·776
'13	69	99	54	77	111	84	83	91	85	45·3	105	$72\frac{5}{8}$	4·771
'14	75	100	58	81	99	81	87	88	85	41·6	109	$72\frac{3}{16}$§	4·038
'15	108	126	70	107	126	92	109	108	108	38·9	106	$69\frac{15}{32}$	5·000
Average													
1906-15....	74	96	55	78	101	77	82	86	82	43·2	$107\frac{1}{2}$	$79\frac{3}{8}$	4·007
1890-99....	61	80	63	68	71	56	66	64	66	55·8	103	$103\frac{9}{16}$	2·958
'78-87....	79	95	76	84	73	71	81	76	79	82·1	97	$99\frac{9}{16}$	3·264
'18-27....	109	90	151	111	128	105	106	112	111	98·0	—	—	—

* Silver 60·84*d*. per oz. = 100.

† Wheat harvest in United Kingdom to 1895, 29 bushels = 100, from 1896, 30 bushels = 100.

‡ Consols and Bank of England Rate are actual figures, not index numbers; Consols 3 per cent. to 1888, $2\frac{3}{4}$ per cent. from 1889, $2\frac{1}{2}$ per cent. from April, 1903.

§ Official average price recorded by Bank of England for seven months to July was 74*l*. 16*s*. 9*d*. per cent., while minimum price during five months to December was $68\frac{1}{2}$ per cent.

The combined index number of the commodities was 108 last year, or 27 per cent. higher than for 1914 and 1913. It compares with 73 in 1908, following upon the banking crisis in the United States, 69 in 1902-03, and 61 in 1896. It was 8 per cent. *above* the standard period 1867-77, 32 per cent. *above* the average of the past ten years —1906-15—and 63 per cent. *above* the average of the lowest decade on record—1890-99—when the average was 66. The index number for 1915 was still, however, lower than in 1873, after the Franco-Prussian war, when the index number reached 111, and was very much lower than during the Napoleonic war.

The monthly fluctuations were as follows:—

February,	1895....	60·0	December,	1912....	86·4	June,	1915 ...	106·4
July,	'96....	59·2	,,	'13 ...	83·8	July,	,, ...	106·4
,,	1900....	76·2	June,	1914....	81·2	August,	,, ...	107·0
December,	'01....	68·4	December,	,, ...	91·6	September,	,, ...	107·8
May,	'07....	82·4	January,	1915....	96·4	October,	,, ...	110·0
February,	'09 ...	71·9	February,	,, ...	100·9	November,	,, ...	113·1
December,	'09 ...	76·3	March,	,, ...	103·7	December,	,, ...	118·4*
,,	'10 ...	77·9	April,	,, ...	105·9			
,,	'11....	80·9	May,	,, ...	107·2			

The rise in prices last year was due in a large measure to a great advance in freight rates. This rise in freights was brought about by the action of the British Government in commandeering and requisitioning for war purposes over one-third of the entire British mercantile marine. The rise in prices was specially noteworthy towards the end of the year, when the shortage of tonnage became very pronounced. Thus the freight rate for grain from the United States (Atlantic Ports) to the United Kingdom, which prior to the war was about 2*s.* per quarter, and which at the end of 1914 was 7*s.* 6*d.* per qr., rose to 11*s.* in March, 1915, declined to 8*s.* 9*d.* in September, and advanced to 17*s.* 6*d.* at the end of December. For the whole year the average rate was 10*s.* 3*d.* per qr. against 2*s.* 7*d.* in 1914. The average price of American wheat for the year was 50 per cent. higher than the average of the previous year, and of this rise 30 per cent. was due to the advance in world prices and about 20 per cent. to higher freight rates. A large part of the rise in prices in 1915 was thus accounted for by the advance in freights.

Taking articles of food and materials separately, the index numbers compare thus (1867-77 = 100 in both cases):—

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* According to the *Statist* the index number for January, 1916, was 123·6, for February 127·0 and for March 130·4.

	Year 1873.	Average.			July, 1896.	June, 1914.	Dec., 1914.	Dec., 1915.	Rise (+) or Fall (−).	
		1878-87	1890-99	1906-15					Year to Dec., 1915.	18 months to Dec., 1915.
									per cent.	per cent.
Food	107	84	68	78	60·0	74·8	90·9	111·4	+22·5	+49·0
Materials	114	76	64	86	58·6	85·7	92·1	123·4	+34·0	+44·0

The greatest rise in prices last year was in textiles, which advanced 43·6 per cent. In comparison with the index-number immediately prior to the war, there was a rise of 38·6 per cent. in textiles at the end of December last. The advance in minerals was as much as 36·3 per cent., making a total advance since war began of 40·6 per cent. The further advance in vegetable food was as much as 29·1 per cent., bringing the aggregate advance to 76·8 per cent. since war began. The rise in animal food was less pronounced, amounting to 22·8 per cent. during 1915 and to 31·4 per cent. since the outbreak of war. Sugar, coffee and tea showed an advance of only 10·8 per cent. for the year and of 34·7 per cent. since June, 1914. This advance was almost entirely confined to sugar, where the rise last year was nearly 30 per cent. The advance in sundry materials last year was 26·8 per cent., making an aggregate advance since war began of 50·2 per cent. This rise occurred more particularly in seeds and in timber. The advance in hides was very small, while olive oil declined in value. Indigo, which showed such an immense advance in the earlier months of the war, rose another 11 per cent., the index-number at the end of December standing at 200 in comparison with 41·4 immediately prior to the war. In the aggregate the advance in foodstuffs during the year was 22·5 per cent. and since war began 49 per cent., while the advance in materials for the year was 34 per cent. and since war began 44 per cent.

The position of the six separate groups of commodities at the end of the last six years and at the end of June, 1914, in comparison with whole periods is illustrated by the following index numbers (1867-77 = 100 in each case):—

	Average.			Dec., 1910.	Dec., 1911.	Dec., 1912.	Dec., 1913.
	1878-87.	1890-99.	1906-15.				
Vegetable food, corn, &c.	79	61	74	63·9	75·5	72·6	65·6
Animal food (meat and butter)	95	80	96	91·0	90·0	96·9	100·5
Sugar, coffee, and tea	76	63	55	51·7	66·2	57·7	52·4
Minerals	73	71	101	91·1	100·6	117·3	102·5
Textiles........................	71	56	77	76·1	68·6	82·5	86·3
Sundry materials........	81	66	82	82·4	80·7	83·2	84·2

	June, 1914.	Dec., 1914.	Dec., 1915.	Rise (+) or fall (−).	
				Year to Dec., 1915. per cent.	18 months to Dec., 1915. per cent.
Vegetable food, corn, &c.	66·5	93·2	117·6	+ 29·1	+ 76·8
Animal food (meat and butter)	97·5	104·3	128·1	+ 22·8	+ 31·4
Sugar, coffee, and tea	51·8	63·0	69·8	+ 10·8	+ 34·7
Minerals	96·7	99·8	136·0	+ 36·3	+ 40·6
Textiles........................	80·6	77·8	111·7	+ 43·6	+ 38·6
Sundry materials........	82·5	97·7	123·9	+ 26·8	+ 50·2

*Quarterly Movements of Prices.**

Summary of Index Numbers, 1867-77 = 100.

Years.	Quarters.	Vegetable Food (Corn, &c.).	Animal Food (Meat, &c.).	Sugar, Coffee, and Tea.	Total Food.	Minerals.	Textiles.	Sundry Materials.	Total Materials	Grand Total.	Silver.†
1905...	IV	62·9	86·6	46·1	68·1	94·1	75·5	70·8	78·5	**74·1**	48·8
'06	I	62·1	89·6	45·3	68·7	96·7	76·5	72·1	80·1	**75·3**	49·7
	II	63·8	89·0	45·1	69·2	99·1	81·3	72·7	82·5	**76·8**	50·3
	III	61·3	89·3	46·5	68·5	101·4	80·1	73·3	83·0	**76·9**	50·7
	IV	61·7	87·9	47·0	68·1	110·5	80·4	76·6	86·9	**78·9**	53·0
'07	I	64·0	88·7	46·7	69·5	112·2	80·0	78·8	88·2	**80·2**	51·5
	II	69·7	88·7	48·0	72·1	112·6	79·8	80·0	88·7	**81·7**	50·6
	III	70·1	89·1	49·1	72·7	106·5	76·8	77·5	85·1	**79·9**	51·9
	IV	73·8	87·0	48·2	73·3	95·9	71·2	76·5	80·1	**77·2**	43·3
'08	I	71·7	88·9	49·1	73·3	92·0	64·9	73·8	76·0	**74·9**	42·0
	II	71·1	90·0	50·0	73·7	87·7	62·6	71·7	73·2	**73·4**	40·3
	III	68·2	90·3	47·2	71·9	88·4	61·7	71·7	73·1	**72·6**	39·3
	IV	67·8	85·1	47·0	69·8	88·5	61·0	74·3	74·0	**72·2**	37·7
'09	I	69·3	85·2	48·7	70·8	85·5	60·2	74·4	73·0	**72·1**	38·5
	II	76·1	91·1	49·6	76·0	84·9	62·8	75·5	74·1	**74·9**	39·9
	III	70·6	90·6	49·9	73·6	86·5	67·4	75·3	75·9	**74·9**	39·0
	IV	67·9	88·2	52·8	72·2	88·2	70·3	77·6	78·2	**75·7**	38·9
'10	I	68·6	95·0	54·6	75·4	90·8	71·4	79·5	80·0	**78·1**	39·1
	II	64·2	98·8	55·2	75·1	88·1	72·3	80·1	79·9	**77·9**	40·7
	III	64·6	98·1	53·5	74·6	87·5	72·4	81·7	80·4	**78·0**	40·5
	IV	63·7	90·6	50·0	70·7	90·1	76·0	82·9	82·7	**77·6**	41·8
'11	I	65·1	90·1	54·0	72·0	92·2	77·8	82·3	83·6	**78·7**	39·9
	II	70·1	89·2	55·1	74·0	92·2	82·3	81·3	84·5	**80·1**	40·3
	III	71·4	88·9	64·7	76·4	92·4	73·9	81·0	81·9	**79·6**	39·7
	IV	75·7	88·8	69·1	79·2	98·4	69·1	80·7	81·9	**80·7**	41·5
'12	I	77·8	93·7	67·1	81·4	103·4	72·4	80·7	84·2	**83·0**	44·1
	II	80·4	98·6	62·6	83·4	107·8	73·9	82·6	86·7	**85·3**	46·2
	III	77·6	99·2	59·8	81·9	115·0	77·2	82·7	89·7	**86·4**	47·2
	IV	74·2	93·4	57·8	77·8	116·9	81·0	83·3	91·7	**85·8**	47·9
'13	I	71·6	101·5	55·7	79·2	113·1	83·0	84·2	91·6	**86·4**	44·9
	II	71·4	99·1	52·7	77·7	114·4	81·1	83·2	90·9	**85·3**	45·2
	III	69·3	99·1	52·1	76·6	110·1	85·2	83·2	91·1	**85·0**	45·6
	IV	65·8	98·7	54·0	75·4	104·8	86·7	83·3	90·1	**83·9**	44·1
'14	I	66·6	98·7	52·0	75·3	104·4	83·1	84·1	89·3	**83·4**	43·7
	II	67·0	97·8	51·8	75·2	98·4	82·9	82·5	86·9	**82·0**	43·4
	III	80·3	102·0	61·5	84·4	96·2	82·4	87·1	88·1	**88·1**	39·4
	IV	90·1	100·9	63·9	88·6	97·2	77·5	97·2	91·1	**90·1**	37·1
'15	I	105·0	114·6	66·7	100·8	110·0	85·4	104·2	100·0	**100·3**	37·9
	II	107·4	129·0	72·5	108·0	121·6	88·5	107·4	105·4	**106·5**	38·3
	III	104·0	130·5	72·0	107·0	120·8	93·5	109·4	107·1	**107·1**	37·9
	IV	113·8	123·9	68·7	108·0	131·2	105·5	119·3	118·0	**113·8**	42·5

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* The four quarterly figures of each year do not in all cases agree with the annual averages, as the latter are partly calculated from revised figures. See also the *Journal*, 1893, p. 221; 1895, p. 144; 1901, p. 90; and 1909, p. 70.

† Silver 60·84*d*. per oz. = 100.

The quarterly numbers show the average of the three monthly figures, and by thus eliminating minor fluctuations they give a more trustworthy comparison of the gradual changes in the various groups of commodities.

The following figures show in each case the average index numbers of all the forty-five commodities for ten years (see the dotted line in the diagram of the *Journal*, 1886, and also the *Journal*, 1893, p. 220); they give the best picture of the gradual movement of the *average* prices of *whole periods*, as the ordinary fluctuations are still further obliterated:—

1818–27 = 111
'28–37 = 93
'38–47 = 93
'48–57 = 89
'58–67 = 99
'68–77 = 100
'78–87 = 79
'88–97 = 67

1890–1899 = 66
'92–1901 = 66
'93– '02 = 66
'94– '03 = 66
'95– '04 = 67
'96– '05 = 68
'97– '06 = 70
'98– '07 = 71

1899-1908 = 72
1900– '09 = 73
'01– '10 = 73
'02– '11 = 74
'03– '12 = 76
'04– '13 = 77
'05– '14 = 79
'06– '15 = 82

The decade 1890-99 was the lowest on record more closely calculated, and since then the average advanced from 66 to 82, or 24 per cent.

Silver.—The silver market was very steady for the greater part of the year, with the price fluctuating between $22\frac{5}{16}$*d.* and $24\frac{5}{16}$*d.* In November, however, there was a sudden advance to $27\frac{1}{4}$*d.*, on the discovery that the stock of silver in London was unexpectedly short, and that the statistical position of the metal was much stronger than anyone had supposed. Whereas, in September, the price touched $23\frac{3}{16}$*d.*, in November it rose to $27\frac{1}{4}$*d.* At the close of the year the price was firm at $26\frac{1}{4}$*d.* The demand throughout the year was mainly for coinage for British and Continental mints. The London mint purchased about 3,000,000*l.* of silver bullion. The purchases for the United States mints were also substantial. The demand for silver for India was unusually small, the amount sent from London having been less than half that in 1913. There was no demand for silver for coinage for the Indian Government, and the inquiry from China was also exceptionally small, indeed a considerable amount of demonetised subsidiary silver coin was sent from China to London for sale. On the other hand, the supply of silver was appreciably reduced, though the falling off in the Mexican supply was smaller than expected notwithstanding the very disturbed state of the country.

The world's production of silver, according to the New York *Commercial and Financial Chronicle*, compares as follows:—

	United States.	Mexico.	Australia.	Other countries.	Total.
	oz.	oz.	oz.	oz.	oz.
1881-85........	36,600,000	24,800,000	200,000	25,900,000	87,500,000
'86-90........	46,200,000	30,100,000	6,200,000	29,000,000	111,500,000
'91-95	57,400,090	42,700,000	14,900,000	43,700,000	158,700,000
'96-1900....	55,900,000	53,900,000	12,100,000	45,000,000	166,900,000
1901-05........	55,800,000	62,800,000	11,000,000	37,800,000	167,400,000
'06	56,500,000	55,200,000	14,200,000	39,700,000	165,600,000
'07	56,500,000	61,100,000	19,100,000	48,300,000	185,000,000
'08	52,400,000	73,700,000	17,200,000	59,900,000	203,200,000
'09	54,700,000	73,900,000	16,400,000	66,200,000	211.200,000
'10	57,100,000	71,400,000	21,500,000	72,800,000	222,800,000
'11	60,400,000	79,000,000	16,600,000	69,400,000	225,400,000
'12	63,800,000	74,600,000	14,700,000	71,200,000	224,300,000
'13	66.800,000	60,000,000	14,000,000	70,000,000	210,800,000
'14	67,900,000	40,000,000	13,800,000	77,000,000	198,700,000
'15	67,500,000	65,000,000	3,500,000	60,000,000	196,000,000

The prices and index numbers were as follows (60·84*d.* per oz. being the parity of 1 gold to 15½ silver = 100) :—

	Price. *d.*	Index Number.		Price. *d.*	Index Number.
Average 1890-99	34	= 55·8	*Lowest* Nov., 1902	$21\frac{11}{16}$	= 35·6
,, 1905-14	$26\frac{7}{16}$	= 43·2	End Dec., 1906	$32\frac{5}{16}$	= 53·1
,, 1893	$35\frac{5}{8}$	= 58·6	,, Dec. '08	$23\frac{3}{16}$	= 38·1
,, 1909	$23\frac{11}{16}$	= 38·9	,, Dec. '11	$25\frac{1}{16}$	= 41·2
,, '12	$28\frac{1}{32}$	= 46·1	,, Dec. '12	29	= 47·7
,, '13	$27\frac{9}{16}$	= 45·3	,, Dec. '13	$26\frac{9}{16}$	= 43·7
,, '14	$25\frac{5}{16}$	= 43·9	,, Dec. '14	$22\frac{11}{16}$	= 37·3
,, '15	$23\frac{11}{16}$	= 38·9	,, Dec. '15	$26\frac{1}{4}$	= 43·1

Gold.—The estimated production in recent years has been as under. The data are as collected by the U.S. Director of the Mint up to 1912, the value per fine ounce being taken at 4·24773*l.* For 1913, 1914 and 1915, the *Statist's* estimates are given :—

	£		£
1881-85	20,900,000	1909........................	93,300,000
'86-90	23,100,000	'10...........	93,500,000
'91-95	33,500,000	'11........................	94,900,000
'96-1900	52,900,000	'12........................	95,800,000
1901-05	66,300,000	'13........................	93,500,000
'06........................	82,700,000	'14........................	92,100,000
'07........................	84,900,000	'15........................	96,900,000
'08........................	91,000,000		

The *Rate of Discount* in the three principal markets is shown in the following table :—

	London.		Paris.		Berlin.		Average of the Three Markets.	
	Bank Rate.	Market Rate.	Bank Rate.	Market Rate.	Bank Rate.	Market Rate.	Bank Rate.	Market Rate.
	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.
1895	2·00	0·80	2·10	1·59	3·14	2·02	2·41	1·47
1900	3·96	3·70	3·25	3·17	5·33	4·41	4·18	3·76
'01	3·72	3·14	3·00	2·48	4·10	3·06	3·61	2·89
'02	3·33	2·96	3·00	2·43	3·32	2·19	3·22	2·53
'03	3·75	3·24	3·00	2·78	3·84	3·01	3·53	3·01
'04	3·39	2·65	3·00	2·19	4·22	3·14	3·50	2·66
'05	3·01	2·61	3·00	2·10	3·82	2·85	3·28	2·52
'06	4·27	3·98	3·00	2·70	5·15	4·04	4·14	3·57
'07	4·92	4·49	3·47	3·40	6·03	5·12	4·81	4·34
'08	3·01	2·23	3·04	2·25	4·76	3·52	3·60	2·67
'09	3·08	2·26	3·00	1·79	3·93	2·87	3·34	2·31
'10	3·73	3·10	3·00	2·44	4·35	3·54	3·69	3·03
'11	3·47	2·89	3·14	2·67	4·40	3·59	3·67	3·05
'12	3·77	3·60	3·38	3·17	4·95	4·22	4·03	3·66
'13	4·77	4·34	4·00	3·88	5·88	5·03	4·88	4·41
'14	4·04	2·88	4·22	2·69*	4·91	—	4·39	—
'15	5·00	3·67	5·00	—	5·00	—	5·00	—

* Average to July 31.

The average rates in 1895 were the lowest on record, those in 1915 the highest since 1873.

Review of the Year.—Economic and political conditions all over the world in 1915 were completely dominated by the great war in Europe, which was prosecuted throughout the twelve months at enormous cost in life and in treasure. In the early part of the year the fortunes of war went in favour of the Entente Powers, the armies in Flanders and in France successfully holding the line against the enemy, while the Russian army advanced a long way into Galicia. Furthermore, Italy declared war upon Austria, and this strengthened their position from all points of view. An effort was made by the Allies to force the Dardanelles in order to open up communication with Russia, and an assault by the Turks upon Egypt was successfully repulsed. In the summer, however, the Austrian army in Galicia was strengthened by a great German force, and the Russian army was forced back into Russian Poland through lack of ammunition and equipment. In their retreat, which involved the evacuation of Warsaw, the Russian army maintained its line unbroken, and in the latter part of the year the German armies were successfully held, both on the Eastern and on the Western fronts. The German and Austrian armies then turned their attention to the Balkans, and with the help of Bulgaria attacked Serbia. France and England endeavoured to come to the assistance of the Serbian army, but without success.

At the end of the year the German army was in occupation of practically the whole of Belgium and a section of France as well as the greater part of Russian Poland, and the Serbian army was being hard pressed by German, Austrian, and Bulgarian forces. On the other hand, the Russian army was in possession of a small strip of Austria; and the colonial possessions of Germany, with the exception of German East Africa, were in the hands of the British forces. The seas were entirely cleared of German warships, a German squadron having been destroyed early in the year off the Falkland Islands by the British Fleet. Throughout the year the mercantile shipping of all nations was subjected to attack from German submarines and a large amount of shipping was destroyed. A considerable number of German submarines were captured or sunk, and no great importance was attached to this submarine attack. On several occasions fleets of German airships visited England, but caused remarkably little damage.

Financially attention was concentrated upon financing the war, and great loans were placed in all the belligerent countries. Beyond having to find the great sum of money needed for her own use, Great Britain supplied her Allies and Colonies with some 350,000,000*l*. of money, the war expenses of Great Britain for the year amounting to about 1,300,000,000*l*. This was provided for in part out of the $3\frac{1}{2}$ per cent. War Loan of 350,000,000*l*. raised in November, 1914, in part by a $4\frac{1}{2}$ per cent. War Loan offered in June, 1915, at par, which brought in a sum of 592,000,000*l*., and in part by sales of Treasury bills and of 5 per cent. five-year Exchequer Bonds. In order to control the foreign exchange the British Treasury prohibited foreign capital issues in Great Britain unless authorised by a Treasury Committee appointed for the purpose. In consequence of a fall in the American exchange upon London to a discount of nearly 8 per cent. Great Britain and France raised a 5 per cent. joint loan in the United States for 100,000,000*l*., and the British Treasury invited British investors to sell their holdings of American securities. Furthermore, British bankers arranged banking credit with American bankers for 10,000,000*l*, which, however, was not required. The effect of all these measures was to restore the value of the sovereign in New York to par, less the cost of remitting gold. During the year over 90,000,000*l*. in gold was sent to the United States from all parts of the world in order to provide in part for America's favourable trade balance of about 350,000,000*l*. The balance of the sum was used by the United States to make loans to various countries to the extent of about 180,000,000*l*., and the balance was employed in purchasing American securities previously held abroad. Both the franc and the rouble fell to a somewhat heavy discount in spite of considerable shipments of gold to London from Paris. The feature of the year, however, was the heavy decline in the value of the mark, which fell to a discount of nearly 20 per cent. in New York. Great Britain's store of gold during the year was reduced by less than 30,000,000*l.*, the imports of gold having been 10,328,000*l.* while the amount exported was 38,618,000*l.* of which about 20,000,000*l.* went to the United States. During the year the stock of gold in the Bank of England was reduced from 69,493,000*l.* to 51,102,000*l.* The amount of British Currency Notes in circulation rose during the year from 38,478,000*l.* to 103,125,000*l.*, while the stock of gold held against these Notes increased from 18,500,000*l.* to 28,500,000*l.* Thus the total amount of gold held against the British note circulation declined only 8,300,000*l.* A substantial amount of gold came in from circulation in consequence of the issue of Currency Notes. Great Britain's trade balance was adverse throughout the year, but was settled by gold shipments, by the sale of securities, and by means of the Franco-British loan in New York. The Bank of England rate remained at 5 per cent. throughout 1915, and there was no lack of money-market money which, indeed, was plentiful throughout the year.

The depreciation or appreciation in the value of the various currencies as measured by the American dollar is shown by the following statement:—

Rates of Exchange of New York on the various foreign cities mentioned on December 30, 1915.

		Rate.	Par as usually quoted.	Discount per cent.
New York on—				
London	sight	\$4 $73\frac{13}{16}$	4. 8666 dollars for 1*l.*	2·6
,, ...	cables	\$4 74½		
,, ...	60 days	\$4 $68\frac{15}{16}$		
Amsterdam	sight	$43\frac{5}{16}$ c.	40¼ cents for 1 guilder	Prem. 7·6
Berlin	sight	$76\frac{5}{16}$ c.	95.28 cents for 4 marks	19·9
Copenhagen	cheques	27.20 c.	26¾ cents for 1 krone	Prem. 1·7
Italy............	sight	6.61¼ l.	5.18¼ lire for \$1	27·6
Paris	sight	5 85½ fr.	5.18¼ francs for \$1	13·0
Petrograd	sight	30 c.	51.45 cents for 1 rouble	41·7
Switzerland	sight	5 26½ fr.	5.18¼ francs for \$1	1·6
Vienna	sight	13 00 c.	20.26 cents for 1 krone	35·8

The arithmetical mean of the forty-five index numbers, which was 108 in 1915, 85 in 1914, 1913 and 1912, 80 in 1911, 78 in 1910, 74 in 1909, and 80 in 1907, has been subjected to the usual test of using the same index numbers of the separate articles, but calculating each article according to its importance in the United Kingdom on the average of the years 1904-06. In this case the average was 107·8 in 1915 against 83·6 in 1914, 83·3 in 1913, 83·7 in 1912, 77·7 in 1911 and 1910, 74·9 in 1909, and 77·4 in 1907. It will be seen that on the basis of quantities the ordinary index number, which has to be accepted for general purposes, slightly exaggerates the rise which has taken place, but it is also impossible to give the exact *proportion* of quantities, as they vary from country to country. In the United Kingdom some heavy goods, such as coal, iron and cotton, also corn, meat and wool, have a preponderating weight if quantities are accepted.

The price movements of the external trade of this country—total imports into the United Kingdom and exports of the produce and manufactures of the United Kingdom—were as follows, 1873 called 111 in accordance with Mr. Sauerbeck's index number (see the *Journal*, 1905, p. 146):—

	Total Imports into United Kingdom and Exports of the Produce and Manufactures of the United Kingdom.			Ratio of Values. 1873 = 111 (1867-77 = 100).	
	Declared Value.	Value at Prices of Preceding Year.*	Values at Prices in 1873.	British Trade.	*Statist's* and Sauerbeck's Index Numbers.
	Mln. £'s.	Mln. £'s.	Mln. £'s.		
1873	626·0	—	626	111·0	111
'89	675·3	664·5	1,005	74·6	72
'96	681·7	671·5	1,162	65·1	61
1903	833·8	826·5	1,323	69·9	69
'04 ...	852·2	847·0	1,345	70·3	70
'05	895·3	889·6	1,408	70·6	72
'06 ...	983·7	940·9	1,480	73·8	77
'07	1,072·1	1,023·5	1,540	77·3	80
'08	970·4	1,010·1	1,451	74·2	73
'09	1,003·1	1,010·4	1,511	73·7	74
'10 ...	1,109·0	1,057·7	1,593	77·3	78
'11	1,134·8	1,138·9	1,635	77·0	80
'12	1,232·3	1,209·2	1,743	78·5	85
'13	1,294·5	1,271·4	1,798	79·9	85
'14	1,127·7	1,123·4	1,561	80·2	85
'15	1,238·4	1,114·0	1,640	89·2	108

* According to the valuable calculations of the *Economist*.

The third column at uniform prices shows the movements of quantities. Last year's total was about 5·1 per cent. larger than in the previous year, although 8·8 per cent. smaller than in 1913. Since 1873 there is a total increase in the external trade of 162 per cent. and since 1896, the year of lowest prices, of 41 per cent. The ratio of values (87·1) is considerably lower than the ordinary index number (108) and the weighted number (107·8).

Construction of the Tables.

The Table of *Index Numbers* is based on the average prices of the eleven years 1867-77, and the index numbers have been calculated in the ordinary arithmetical way ; for instance, English wheat :—

s. d.
Average, 1867-77.... 54 6 = 100, average point.
,, '55 .... 74 8 = 137, or 37 per cent. above the average point.
,, 1914........ 35 0 = 64 ,, 36 ,, below ,,

The index numbers therefore represent simple percentages of the average point.

Certain articles which appear to have something in common have been grouped together, with the following result :—

		1867-77. Total Numbers.	Example for 1915	
			Total Numbers.	Average.
1. Vegetable food, corn, &c. (wheat, flour, barley, oats, maize, potatoes, and rice)	8 Index Nos.	800	866	108
2. Animal food (beef, mutton, pork, bacon, and butter)	7 ,,	700	881	126
3. Sugar, coffee, and tea	4 ,,	400	281	70
1—3. *Food*	19 ,,	1,900	2,028	107
4. Minerals (iron, copper, tin, lead, and coal)	7 ,,	700	880	126
5. Textiles (cotton, flax, hemp, jute, wool, and silk)	8 ,,	800	739	92
6. Sundry materials (hides, leather, tallow, oils, soda, nitrate, indigo, and timber)	11 ,,	1,100	1,197	109
4—6. *Materials*	26 ,,	2,600	2,816	108
General average	45 ,,	4,500	4,844	108

The *general average* is drawn from all forty-five descriptions, which are treated as of equal value, and is the simple arithmetical mean as shown above.

*Average Prices of Commodities.**

No. of Article	0	1	2	3	4	5	6	7	8	1—8	9	10
		Wheat.		Flour.	Barley.	Oats.	Maize.	Potatoes.*	Rice.	Vegetable Food.	Beef.‡	
Year.	Silver.†	English Gazette.	American.	Town Made White.	English Gazette.	English Gazette.	American Mixed.	Good English.	Rangoon Cargoes to Arrive.	Total	Prime.	Middling.
	d. per oz.	*s.* and *d.* per qr.	*s.* and *d.* per qr.	*s.* per sack (280 lbs.).	*s.* and *d.* per qr.	*s.* and *d.* per qr.	*s.* per qr.	*s.* per ton	*s.* and *d.* per cwt.		*d.* per 8 lbs.	*d.* per 8 lbs.
1873	$59\frac{1}{4}$	58·8	63	51	40·5	25·5	30	160	9·6	—	65	56
1901	$27\frac{3}{16}$	26·9	30	$26\frac{1}{2}$	25·2	18·5	$22\frac{1}{4}$	78	6·7	—	49	42
'02	$24\frac{1}{16}$	28·1	30·6	26	25·8	20·2	25	69	6·2	—	54	47
'03	$24\frac{3}{4}$	26·9	31	27	22·8	17·2	22	84	7·3	—	48	42
'04	$26\frac{3}{8}$	28·4	33·6	$28\frac{1}{2}$	22·4	16·4	$21\frac{1}{2}$	90	6·7	—	48	42
'05	$27\frac{13}{16}$	29·8	34	$28\frac{1}{2}$	24·4	17·4	23	65	6·9	—	47	40
1906	$30\frac{7}{8}$	28·3	32·6	$26\frac{1}{2}$	24·2	18·4	22	67	7·3	—	47	40
'07	$30\frac{3}{16}$	30·7	36	29	25·1	18·10	$24\frac{1}{2}$	88	8·3	—	49	42
'08	$24\frac{3}{8}$	32	37·6	$31\frac{1}{2}$	25·10	17·10	$26\frac{3}{4}$	81	7·7	—	52	45
'09	$23\frac{11}{16}$	36·11	41·6	$34\frac{1}{2}$	26·10	18·11	$27\frac{1}{2}$	66	7·1	—	52	45
'10	$24\frac{5}{8}$	31·8	36·6	31	23·1	17·4	$23\frac{3}{4}$	72	7·3	—	54	48
1911	$24\frac{9}{16}$	31·8	35	29	27·3	18·10	$25\frac{1}{4}$	87	8·2	—	51	45
'12	$28\frac{1}{32}$	34·9	38	32	30·8	21·6	$27\frac{1}{2}$	86	10·1	—	56	49
'13	$27\frac{9}{16}$	31·9	36·5	$30\frac{1}{2}$	27·3	19·1	$23\frac{5}{8}$	78	8·2	—	54	49
'14	$25\frac{5}{16}$	35·0	40·1	$33\frac{1}{2}$	27·2	21·0	$29\frac{1}{4}$	$71\frac{1}{2}$	9·1	—	$56\frac{1}{2}$	$52\frac{1}{2}$
'15	$23\frac{11}{16}$	53·11	59·10	49	37·4	30·9	$41\frac{1}{2}$	$93\frac{1}{2}$	13·3	—	$72\frac{1}{8}$	$67\frac{7}{8}$
Average												
1906-15....	$26\frac{1}{4}$	$34\frac{2}{3}$	$39\frac{1}{3}$	$32\frac{5}{8}$	$27\frac{1}{2}$	20·3	$27\frac{1}{8}$	79	$8\frac{5}{8}$	—	$54\frac{3}{8}$	$48\frac{3}{8}$
1890-99....	34	$28\frac{1}{2}$	$31\frac{1}{2}$	$27\frac{1}{2}$	$25\frac{1}{2}$	$17\frac{1}{2}$	$19\frac{1}{2}$	72	$6\frac{3}{4}$	—	47	$37\frac{1}{2}$
'78-87....	50	40	$43\frac{1}{2}$	$34\frac{1}{2}$	$31\frac{1}{2}$	21	25	102	8	—	$55\frac{1}{2}$	46
'67-77....	$58\frac{1}{2}$	$54\frac{1}{2}$	56	46	39	26	$32\frac{1}{2}$	117	10	—	59	50
	Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.											
1873	97·4	108	113	104	104	98	92	137	95	851	110	112
'01	44·7	49	54	58	65	71	68	67	66	498	83	84
'02	39·6	52	54	56	66	78	77	59	62	504	92	94
'03	40·7	49	55	59	59	66	67	72	72	499	81	84
'04	43·4	52	60	62	57	63	66	77	66	503	81	84
'05	45·7	55	61	62	62	67	71	56	67	501	80	80
1906	50·7	52	58	58	62	70	68	57	73	498	80	80
'07	49·6	56	64	63	64	72	75	75	82	551	83	84
'08	40·1	59	67	69	66	69	82	69	76	557	88	90
'09	38·9	68	74	75	69	73	85	56	71	571	88	90
'10	40·5	58	65	67	59	67	73	62	72	523	92	96
1911	40·4	58	63	63	70	72	78	74	82	560	87	90
'12	46·1	64	68	70	79	83	85	74	101	624	95	98
'13	45·3	58	65	66	70	73	73	67	82	554	92	98
'14	41·6	64	72	73	70	81	90	61	91	602	96	105
'15	38·9	99	107	106	96	118	128	80	132	866	122	136

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* The annual prices are the averages of twelve monthly or fifty-two weekly quotations; potatoes of eight monthly quotations, January to April and September to December.

† Index numbers of silver as compared with 60·84*d.* per ounce being the parity between gold and silver at 1 : 15½; not included in the general average.

‡ Meat (9—13), by the carcase, in the London meat market.

Average Prices of Commodities—Contd.

No. of Article	11	12	13	14	15	9—15	16A	16B	17	18A*	18B*	18
	Mutton.		Pork.	Bacon.	Butter.		Sugar.			Coffee.		
Year.	Prime.	Mid-dling.	Large and Small, Average.	Water-ford.	Fries-land, Fine to Finest.	Animal Food. Total.	British West Indian Refining.	Beet, German, 88 p. c., f.o.b.	Java, Floating Cargoes.	Ceylon Planta-tion, Low Mid-dling.†	Rio, Good.	Mean of 18A and 18B.
	d. per 8 lbs.	*d.* per 8 lbs.	*d.* per 8 lbs.	*s.* per cwt.	*s.* per cwt.		*s.* per cwt.	*s.* per cwt.	*s.* per cwt.	*s.* per cwt.	*s.* per cwt.	
1873	71	63	54	81	123	—	22½	25	28	100	86	—
1901	54	44	49	63	105	—	9¼	8½	10¾	70	35	—
'02	55	44	48	63	102	—	7¼	6¾	8½	70	31	—
'03	58	47	44	60	100	—	8½	8¼	9¾	70	30	—
'04	59	50	39	57	102	—	10¼	10¼	11½	75	37	—
'05	59	51	46	65	107	—	11	11¼	12¾	75	40	—
1906	60	53	49	65	110	—	8½	8⅝	10	75	39	—
'07	60	54	45	63	108	—	9	9½	10⅞	75	31	—
'08	58	52	43	62	114	—	9¾	10½	11½	66†	31	—
'09	52	46	49	71	112	—	10¼	11	12¼	70	35	—
'10	58	52	54	75	114	—	11	12¾	13¼	69	42	—
1911	55	49	46	66	121	—	11½	13	14	83	58	—
'12	59	54	50	69	123	—	11	12¼	13⅜	87	66	—
'13	62	56	55	77	119	—	9½	9½	10⅞	81	53	—
'14	64	57½	49	75¾	120	—	11¾	12⅛	13⅝	79	45	—
'15	75⅛	69¾	72	93¼	141	—	14⅜	17⅛	18¾	78½	43½	—
Average 1906-15 ..	60⅜	54⅜	51¼	71¾	118¼	—	10⅝	11⅝	12⅞	76⅜	44⅜	—
890-99....	54½	41½	42½	59	100	—	11½	11½	13¾	98	62	—
'78-87...	64½	53	49	71	116	—	17	18	21½	78	52	—
'67-77....	63	55	52	74	125	—	23	24	28½	87	64	—
	Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.											
										*	*	
1873	113	114	104	109	98	760	101		98	115	134	125
1901	86	80	94	85	84	596	38		38	80	55	67
'02	87	80	92	85	82	612	30		30	80	48	64
'03	92	85	85	81	80	588	36		34	80	47	63
'04	94	91	75	77	82	584	44		40	86	58	72
'05	94	93	88	88	86	609	47		45	86	62	74
1906	95	96	94	88	88	621	36		35	86	61	73
'07	95	98	87	85	86	618	39		38	86	48	67
'08	92	95	83	84	91	623	43		40	76	48	62
'09	83	84	94	96	90	625	45		43	80	55	67
'10	92	95	104	101	91	671	51		47	79	66	72
1911	87	89	88	89	97	627	52		49	95	91	93
'12	94	98	96	93	98	672	49		47	100	103	102
'13	99	102	105	104	95	695	40		38	93	83	88
'14	102	105	94	102	96	700	50		48	91	70	81
'15	119	127	138	125	113	881	67		66	90	68	79

* Index numbers not included in the general average.

† East India good middling from 1908.

Average Prices of Commodities—Contd.

No. of Article }	19A*	19C*	19B*	19	16—19	1—19	20A	20B	21	22	—	23
	Tea.				Sugar, Coffee, and Tea.		Iron.			Copper.		Tin.
Year.	Congou, Common. *d.* per lb.	Indian Good Medium. *d.* per lb.	Average Import Price. *d.* and dec. per lb.	Mean of 19A and 19B.	Total.	Food. Total.	Scotch Pig. *s.* and *d.* per ton	Cleveland (Middlesbrough) Pig. *s.* and *d.* per ton	Bars, Common. £ per ton	Chili Bars. £ per ton	English Tough Cake. £ per ton	Straits. £ per ton
1873	12	—	16·67	—	—	—	117·3	—	12½	84	92	132
1901	4	5¾	7·67	—	—	—	53·9	45·5	6½	66	71	118
'02	3¾	5¾	7·20	—	—	—	54·6	49·3	6⅛	53	57	121
'03	4¼	6½	7·71	—	—	—	52·3	46·3	6¼	58	62	127
'04	5	6⅜	7·24	—	—	—	51·5	43·3	6⅛	59	63	127
'05	4¼	5¾	7·24	—	—	—	53·6	49·6	6½	70	74	143
1906	4	5¾	7·40	—	—	—	58·9	53·0	7¼	88	92	181
'07	5¼	7	8·13	—	—	—	63·6	55·7	7½	87	92	172
'08	5¼	6⅞	7·96	—	—	—	56·1	50·5	6¾	60	64	133
'09	5	7⅛	8·16	—	—	—	55·1	49·3	6½	59	62	135
'10	4½	7¼	8·23	—	—	—	56·1	50·1	6½	57	61	155
1911	5¼	8½	9·00	—	—	—	53·5	47·3	6⅜	56	60	191
'12	5⅜	8¼	8·78	—	—	—	64·2	58·2	7⅜	73	78	210
'13	5	8¼	9·06	—	—	—	65·6	58·3	7¾	68	73½	201
'14	6	8⅝	9·19	—	—	—	57·1	51·0	7	59½	64½	151
'15	8⅜	10½	11·01	—	—	—	71·2	65·2	10½	72¾	82½	164
Average												
1906-15....	5⅜	7⅝	8⅝	—	—	—	60	53⅞	7⅜	68	73	169⅜
1890-99 ..	4⅝	7½	9¾	—	—	—	47	41½	5½	50	53	81
'78-87....	6¾	—	12¾	—	—	—	46	38	5½	55	60	89
'67-77....	11¼	—	17¼	—	—	—	69	60	8¼	75	81	105

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

1873	*107	—	*97	102	426	2,037	170	—	152	112	—	126
1901	36	—	44	40	183	1,277	78	—	79	88	—	112
'02	33	—	42	38	162	1,278	79	—	74	71	—	115
'03	38	—	44	41	174	1,261	76	—	76	77	—	121
'04	44	—	42	43	199	1,286	74	—	74	79	—	121
'05	38	—	42	40	206	1,316	80	—	79	93	—	136
1906	36	—	43	40	184	1,303	86		88	117	—	172
'07	47	—	47	47	191	1,360	92		91	116	—	164
'08	47	—	46	46	191	1,371	82		82	80	—	127
'09	44	—	47	46	201	1,397	81		79	79	—	129
'10	40	—	48	44	214	1,408	82		79	76	—	148
1911	47	—	52	50	244	1,431	78		77	75	—	182
'12	48	—	51	50	248	1,544	95		89	97	—	200
'13	44	—	52	48	214	1,463	96		94	91	—	191
'14	53	—	53	53	232	1,534	84		85	79	—	144
'15	74	—	64	69	281	2,028	106		128	97	—	156

* Index numbers not included in the general average.

Average Prices of Commodities—Contd.

No. of Article }	24	25A	25B	26	20—26	27	28	29A	29B	30A	30B	31
	Lead.	Coal.				Cotton.		Flax.		Hemp.		Jute.
Year.	English Pig.	Wallsend Hetton in London.	Newcastle Steam.	Average Export Price.	Minerals. Total.	Middling American.	Fair Dhollerah.	Petrograd.	Russian, Average Import.	Manila Fair Roping.	Petrograd Clean.	Good Medium
	£ per ton	*s.* per ton	*s.* per ton	*s.* and dec. per ton		*d.* per lb.	*d.* per lb.	£ per ton	£ per ton	£ per ton	£ per ton	£ per to
1873	$23\frac{1}{2}$	32	—	20·90	—	9	$6\frac{3}{16}$	$47\frac{1}{2}$	44	43	36	18
'01	$12\frac{3}{4}$	20	$12\frac{1}{2}$	13·86	—	$4\frac{3}{4}$	$3\frac{15}{32}$	38	$39\frac{1}{2}$	37	27	$12\frac{3}{4}$
'02	$11\frac{3}{8}$	$18\frac{1}{2}$	$11\frac{1}{4}$	12·29	—	$4\frac{27}{32}$	$3\frac{11}{16}$	32	37	43	27	$12\frac{1}{4}$
'03	$11\frac{3}{4}$	$16\frac{1}{2}$	$10\frac{1}{2}$	11·70	—	6·03	$4\frac{1}{8}$	32	36	36	27	$13\frac{1}{2}$
'04	$12\frac{1}{4}$	$16\frac{1}{4}$	$9\frac{1}{2}$	11·13	—	6·60	5	36	$38\frac{1}{2}$	38	28	14
'05	$14\frac{1}{4}$	$15\frac{1}{2}$	$9\frac{1}{4}$	10·56	—	5·09	$4\frac{5}{32}$	32	35	$39\frac{1}{2}$	29	$18\frac{1}{2}$
1906	$17\frac{1}{2}$	$16\frac{1}{2}$	$10\frac{1}{2}$	10·90	—	5·95	$4\frac{13}{16}$	33	37	$41\frac{1}{2}$	31	$23\frac{1}{2}$
'07	$19\frac{1}{2}$	$19\frac{3}{4}$	$14\frac{1}{2}$	12·75	—	6·55	$4\frac{7}{16}$	30	34	35	31	21
'08	$13\frac{7}{8}$	18	12	12·77	—	5·72	$4\frac{5}{16}$	23	$29\frac{1}{2}$	$24\frac{1}{2}$	28	$15\frac{1}{2}$
'09	$13\frac{1}{2}$	$17\frac{1}{2}$	11	11·30	—	6·33	$4\frac{7}{8}$	28	$32\frac{1}{2}$	$24\frac{1}{2}$	28	13
'10	$13\frac{1}{4}$	$17\frac{1}{4}$	$10\frac{1}{2}$	11·72	—	8·00	6	35	37	23	30	$14\frac{3}{4}$
1911	$14\frac{3}{8}$	$17\frac{3}{4}$	$10\frac{7}{8}$	11·43	—	7·04	6	37	$43\frac{1}{2}$	20	33	$20\frac{1}{4}$
'12	$18\frac{1}{4}$	$21\frac{3}{4}$	$14\frac{3}{4}$	12·70	—	6·45	$5\frac{5}{16}$	$36\frac{1}{2}$	$40\frac{1}{2}$	26	37	21
'13	$19\frac{1}{8}$	$21\frac{1}{2}$	$15\frac{1}{2}$	13·94	—	7·01	$5\frac{11}{16}$	34	$41\frac{1}{4}$	$31\frac{3}{4}$	38	$26\frac{1}{2}$
'14	$19\frac{1}{4}$	$21\frac{1}{4}$	$14\frac{1}{8}$	13·65	—	6·41	$4\frac{9}{16}$	33	38	$26\frac{3}{4}$	43	$27\frac{1}{8}$
'15	24	$30\frac{3}{4}$	$21\frac{1}{8}$	16·96	—	5·87	$4\frac{3}{8}$	$59\frac{3}{4}$	$66\frac{3}{8}$	$41\frac{1}{8}$	$60\frac{1}{2}$	$21\frac{1}{8}$
Average 1906-15....	$17\frac{1}{4}$	20	$13\frac{1}{2}$	12·81	—	$6\frac{1}{2}$	5	35	40	$29\frac{5}{8}$	36	$20\frac{3}{8}$
1890-99 ...	12	$17\frac{1}{2}$	$10\frac{3}{8}$	$10\frac{3}{8}$	—	$4\frac{1}{4}$	3	27	$27\frac{1}{2}$	$26\frac{1}{2}$	25	$12\frac{1}{2}$
'78-87....	14	$16\frac{3}{4}$	$8\frac{5}{8}$	9	—	6	$4\frac{1}{4}$	33	34	$35\frac{1}{2}$	$26\frac{1}{2}$	15
'67-77....	$20\frac{1}{2}$	22	$12\frac{1}{2}$	$12\frac{1}{2}$	—	9	$6\frac{3}{4}$	46	48	43	35	19

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

Year.	24	25A	25B	26	20—26	27	28	29A–29B	30A–30B	31
1873	117	145	—	167	989	100	92	97	101	95
'01	62	91	—	111	621	53	51	82	82	67
'02	55	84	—	98	576	54	55	74	90	64
'03	57	75	—	94	576	67	61	72	81	71
'04	60	74	—	89	571	73	74	79	85	74
'05	70	70	—	84	612	57	62	71	88	97
1906	85	75	—	87	710	66	71	74	93	124
'07	95	90	—	102	750	73	66	68	85	111
'08	68	82	—	102	623	64	64	56	67	82
'09	66	80	—	90	604	70	72	64	67	68
'10	65	78	—	94	622	89	89	77	68	78
1911	70	81	—	91	654	78	89	86	68	107
'12	89	99	—	102	771	72	79	82	81	111
'13	93	98	—	112	775	78	84	80	89	140
'14	95	97	—	109	693	71	67	76	89	143
'15	117	140	—	136	380	65	64	134	130	111

Average Prices of Commodities—Contd.

No. of Article	32A	32B	33	34	27—34	35A	35B	35C	36A	36B	37
	Wool.			Silk.		Hides.			Leather.		Tallow.
Year.	Merino Port Phillip Average Fleece *d.** per lb.	Merino, Adelaide, Average Grease. *d.* per lb.	English, Lincoln Half Hogs. *d.* per lb.	Tsatlee. *s.* per lb.	Textiles. Total.	River Plate, Dry. *d.* per lb.	River Plate, Salted. *d.* per lb.	Average Import. *d.* and dec. per lb.	Dressing Hides. *d.* per lb.	Average Import. *d.* per lb.	Town. *s.* per cwt.
1873 ……..	25	11¾	24½	21¾	—	11	8¼	—	18¼	—	44
1901 ……..	13	6⅜	6⅞	10½	—	7½	6	5·34	14	13½	28
'02 ……..	15	7⅝	6¼	11	—	7⅝	6⅜	5·52	14	14½	32½
'03 ……..	16	8¼	7¼	13½	—	8	6½	5·75	14	15½	29½
'04 ……..	16	8	10⅛	12½	—	8¼	6¾	5·66	14	15	26½
'05 ……..	17¼	8¾	12⅜	12¾	—	9	7¼	5·98	14	15¼	26½
1906 ……..	18	9¼	13⅜	13¾	—	10	7¾	6·52	16½	16	30½
'07 ……..	18	9⅜	12¼	15¼	—	9¾	7⅝	6·98	16	17⅞	34½
'08 ……..	15¾	7⅞	8½	10½	—	8¼	5⅞	6·30	14½	17¼	30½
'09 ……..	17¾	9¼	9	9¾	—	9¼	7	6·73	15	17¼	30½
'10 ……..	18¼	9⅝	9⅞	10¼	—	9¾	7⅝	7·15	16	17½	35½
1911 ……..	17¼	8¾	10	10⅞	—	9¾	7½	7·17	17	17¼	33½
'12 ……..	17½	9¼	10½	10⅝	—	10½	8⅜	7·51	17½	17½	33
'13 ……..	18	9½	12⅜	11	—	12⅜	9½	8·62	19½	19¼	34⅜
'14 ……..	18½	9⅜	12⅝	10⅞	—	13⅛	9½	9·11	21⅛	19¾	31½
'15 ……..	21⅜	10⅞	17⅜	9¹³⁄₁₆	—	13	11	10·04	28⅝	21¾	36⅜
Average 1906-15….	18	9⅜	11½	11⅜	—	10½	8⅛	7⅝	18⅛	18⅛	33
1890-99….	13½	6½	10	11½	—	6¼	5½	5	13¼	13¾	25
'78-87 …	18½	8⅜	11¾	15	—	8⅝	6¾	6½	15	17	35½
'67-77….	21¼	9⅞	19¾	23	—	9	7	6⅞	16	18¾	45

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

No. of Article	32A	32B	33	34	27—34	35A	35B	35C	36A	36B	37
1873 ……..	118	—	124	95	822	120	—	—	114	—	97
'01 ……..	62		35	46	478	84		—	87	—	62
'02 ……..	72		32	48	489	87		—	87	—	72
'03 ……..	78		37	59	526	91		—	87	—	65
'04 ……..	77		51	54	567	94		—	87	—	59
'05 ……..	84		63	55	577	95		—	84	—	59
1906 ……..	87		68	60	643	103		—	94	—	68
'07 ……..	88		62	66	619	105			97		77
'08 ……..	76		43	45	498	90			91		68
'09 ……..	87		46	42	516	100			93		68
'10 ……..	90		51	45	587	106			96		79
1911 ……..	83		51	47	609	106			99		74
'12 ……..	86		53	46	610	114			101		73
'13 ……..	88		63	48	670	133			112		76
'14 ……..	90		64	47	647	139			118		70
'15 ……..	104		88	43	739	149			145		81

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* Port Philip fleece washed nominal since 1895, exactly in proportion with the value of clean wool.

Average Prices of Commodities—Contd.

No. of Article	38	39	40A	40B	41	42	43	44	45A	45B	35—45	20—45	1—45
	Oil.			Seeds	Petroleum.*	Soda.		Indigo.	Timber.				
Year.	Palm. £ per ton.	Olive. £ per tun.	Linseed. £ per ton.	Linseed. s. per qr.	Refined. d. per gall.	Crystals. s. per ton	Nitrate of Soda. s. per cwt.	Bengal, Good Consuming. s. per lb.	Hewn, Average Import. s. per load.	Sawn or Split, Average Import. s. per load.	Sundry Materials. Total.	Materials. Total.	Grand Total.
1873	38	43	32	62	15¼	100	15½	6¾	65	62	—	—	—
1901	26	38	30	53	6½	65	9	3⅜	39	52	—	—	—
'02	27½	34	28	50	6¼	64	9¾	3¼	39	51	—	—	—
'03	28	33	21	39	6¼	64	9¾	3¼	39	54	—	—	—
'04	27½	32	16	33	6⅛	64	10¼	2⅞	36	51	—	—	—
'05	27	36	18	39	5⅝	64	11	2⅞	38	51	—	—	—
1906	30½	39	20¾	43	6⅛	64	11¼	3	40	55	—	—	—
'07	33	43	23½	44	6¾	64	11¼	3¼	40	57	—	—	—
'08	27½	43	22¼	45	6¾	61	10½	3⅜	36	53	—	—	—
'09	29	50	24¾	49	6⅜	61	10¼	3¼	34	54	—	—	—
'10	35	47	38½	66	6	61	9¾	3⅛	36	57	—	—	—
1911	34½	50	42¼	70	5⅜	57	10	3	38	57	—	—	—
'12	33	48	35¼	60	8¼	53	11¼	2¾	41	60	—	—	—
'13	35¼	49½	24¾	45½	8½	47½	11½	2¾	40	63	—	—	—
'14	37¾	50¾	24⅞	48⅝	7 9/16	47½	10⅞	5¾	41¾	64½	—	—	—
'15	34 11/16	51⅞	30⅛	57⅜	8 15/16	48⅜	12⅝	13⅜	58⅞	94¼	—	—	—
Average 1906-15....	33	47¼	28¾	53	6⅞	56	10⅞	4 7/16	40½	61½	—	—	—
1890-99...	24½	35	19¼	38	5⅛	53	8¼	4⅜	40	45	—	—	—
'78-87....	32½	40	23	46	6⅞	62	12½	6	47	47	—	—	—
'67-77....	39	50	30	60	12½*	92	14	7¼	60	54	—	—	—

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

1873	97	86	105	* 122	109	110	92	111	1,163	2,974	5,011
1901	67	76	92	52	71	64	47	80	782	1,881	3,158
'02	71	68	87	50	70	70	45	79	786	1,851	3,129
'03	72	66	67	50	70	70	45	82	765	1,867	3,128
'04	71	64	54	49	70	73	40	76	737	1,875	3,161
'05	69	72	63	45	70	79	40	78	754	1,943	3,259
1906	78	78	71	49	70	80	41	83	815	2,168	3,471
'07	85	86	75	54	70	80	45	85	859	2,228	3,588
'08	71	86	75	54	66	75	46	78	800	1,921	3,292
'09	74	100	82	51	66	73	45	77	829	1,949	3,346
'10	90	94	116	48	66	70	43	82	890	2,099	3,507
1911	88	100	125	43	62	71	41	83	892	2,155	3,586
'12	85	96	106	66	58	80	38	89	906	2,287	3,831
'13	90	99	78	68	52	82	38	90	918	2,363	3,826
'14	84	101	82	61	52	78	80	93	958	2,298	3,832
'15	89	104	97	71	53	90	184	134	1,197	2,816	4,844

* Petroleum as compared with the average from 1873-77 only.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Napier Tercentenary Memorial Volume.* Edited by C. G. Knott. xi + 441 pp., 4to. London: Longmans, Green and Co. 1916. Price 21*s.* net.

This handsome book is valuable, not merely as a record of the celebration of the Napier Tercentenary at Edinburgh shortly before the outbreak of the war, but also as a collection of papers, written by the highest authorities, on many topics connected with Napier and methods of calculation. For three centuries, logarithms have been an essential aid to calculation; the time is coming when calculating machines may take their place in certain types of computations. But calculating machines are necessarily expensive, and for many years to come the ordinary mathematician or statistician will, it may be supposed, find it necessary to use logarithms. How was the great discovery made? Lord Moulton's masterly inaugural address answers this question. The answer is not what the modern mathematician familiar with algebra would naturally suppose. Lord Moulton, judging by the great experience of inventions which he obtained from his practice as a patent lawyer, says that pioneer inventions are rarely made in the way in which we should have supposed they had been; and traces out the three stages in Napier's discovery in a most fascinating way. The Congress were most fortunate in having an inaugural address of such very high merit.

The remaining papers are of a miscellaneous character—biographical, topographical, historical, and mathematical. All are interesting.

Napier's life, so far as it is known, was strangely unlike that of the modern mathematician. He was suspected of dealings with the black art; he did, in fact, make a strange contract with an outlaw about the finding of hidden treasure; like Newton he wrote a book on Revelation. His friendship with Briggs was a charming episode, and Professor Gibson still shows that it was Napier and not Briggs who made the important improvement of taking 0 as the logarithm of 1.

Want of space forbids an account, or even a list of the different papers. Statisticians will be interested by M. Quiquet's paper on Dr. Goldziher's criterion to test the applicability of the Gompertz-Makeham Law, and by Dr. Sheppard's paper on the extension of accuracy of Mathematical Tables by the Improvement of Differences. Archæologists will read Mr. George Smith's paper on Merchiston Castle. Historians of mathematics will learn from Lieutenant Salih Mourad's paper how logarithms were introduced into Turkey; and will derive profit from the papers by Professor Vacca and others dealing with the history of logarithms. Other papers are for the pure mathematician; even crystallographers are not overlooked. The celebration was a great success: this permanent record of it demonstrates the greatness of Napier, who will for ever be one of the glories of Scotland. C.P.S.

2.—*Les Bases Théoriques de la Statistique Agricole Internationale.* By Umberto Ricci. 314 pp., 8vo. Rome: Imprimerie de l'Institut d'Agriculture. 8vo. 1915. Price 5 francs.

The author, who is "chef du service de la Statistique Générale" at the International Institute at Rome, deals comprehensively with the difficulties of putting together the data furnished by the various countries of the world. The first part of the book deals with the more obvious difficulties such as varying weights and measures, the varying exactitude of the estimates of areas under cultivation and of production in different countries. In chapter xiv, he sums up the principal requirements for systems of statistics which would, if universally adopted, best enable the Institute to deal with world figures. Areas, for instances, should exclude the space occupied by ditches, roads, canals, &c. The nomenclature of crops should be clear and detailed—distinguishing, for instance, between spring wheat and winter wheat, &c.

The second part of the volume is mainly concerned with the difficulties of putting together the estimates of crop yields antecedent to the harvests. The author very rightly argues that the mere fact that such figures are estimates only, is no reason why they should not be put together so far as possible. If it is worth while to make estimates for each country separately, it is worth while to attempt estimates for the whole world—or at least, for as large a part as possible. Of the many difficulties, those which appear most prominent are, firstly, the fact that some countries, such as the United States, give figures which compare the probable crop with an undefined "normal." If the estimate for maize is given for August 1 as 80 per cent., that does not mean that 80 per cent. of the average yield per acre over the preceding ten (or any other number of) years is to be expected. Observation of the estimates as compared with the actual yield over a number of years is required in order to show what figure in the estimate really does indicate approximately average prospects. The author then re-calculates the figures on the basis of 100 for the expectation of an average yield, 110 for the expectation of a yield 10 per cent. above the average, &c. The Americans, apparently, do intend their figures to indicate an expected yield ; they are not merely an arbitrary system of "marks," but the estimator takes the point of view—given the existing state of the crop, what yield (compared with the "normal") would be expected, in the absence of *any* unfavourable circumstances, in the future ? The author rightly points out that it is better to base a figure on the assumption that there will be the normal amount of unfavourable circumstances in the future.

The second principal difficulty is to deal with those countries, like Germany, which do not give an estimated yield, but which have an arbitrary scale of "marks," 1 for very good, 2 for good, 3 middling, 4 bad, 5 very bad. The author makes out a fairly convincing case for his belief that such marking, if carefully done, can be translated into percentages of expected yield by examination of the markings and of the actual yield over a series of years. Some will think, possibly, his scientific method of calculation rather wasted on what must be at best a rough estimate. The German markings, however, are probably not a much inferior basis to work upon than figures which are put forward avowedly as estimates of yield. In connection with the question how many months in advance it is worth while to try to estimate, the author gives tables of the co-efficients of correlation between the German markings for one month, two months, &c., in advance, and the actual yields which were obtained for a number of years. It is evident that the value of the markings varies for different crops, but on the whole, the correlation is about as close as for the American estimates and yields in the case of a number of crops, and the author concludes that estimates four months in advance are worth making. That certainly is the case for some crops, but hardly for all. For Germany (p. 283) the May markings for condition of winter wheat show a co-efficient of correlation with yields of $-\cdot 73$ ($\pm \cdot 09$). For spring wheat the May co-efficient is $+\cdot 19 \pm \cdot 19$ (showing negative correlation on the German system of marking 1 for very good and 5 for very bad). For the United States (p. 249) the spring wheat seems to be judged much more accurately than the winter wheat. The world will always try to make estimates of crop yields, so the estimates may as well be as good as circumstances permit. It is to be hoped that the efforts of the Institute will gradually result in greater uniformity of methods, and the correction of erroneous and careless systems, which are still too prevalent.

C.F.B.

3.—*A History of Currency in the United States.* By A. Barton Hepburn, LL.D., formerly Comptroller of the Currency. xv + 552 pp. 8vo. New York: The Macmillan Company, 1915. Price 10*s.* 6*d.* net.

The purpose of this book may be best stated in the author's own words. "My aim is to place before the public all the essential "facts as to currency, coinage and banking from the wampumpeage "currency of the colonies to the notes of the Federal Reserve Banks, "together with the indispensable political history connected "therewith.

"The volume deals fully and explicitly with our coinage laws and "coinage by our mints; it gives the complete history of the national "banking system, and contrasts and compares the banking systems "of the various states. It relates the history of the legal tender "notes and discusses them as a substitute for taxation, touching "upon the political history of the period inasmuch as the question "of the legality of these notes was made a political issue; the history "of the silver controversy is fully told especially from the so-called "'crime of 1873'; the various international efforts in favour of the "bi-metallic standard are likewise set forth."

The basis of the work, as the author states in his Preface, is *The Contest for Sound Money*, published in 1903; which has been rewritten and supplemented so that as now issued it covers the period from the adoption of the United States Constitution down to the present time. The chief changes may be noted here. Chapters 1 and 2, dealing with Colonial and Continental currency, are new: so are chapters 20, 23 and 25, dealing with the defects of the National Banking System and the great reform made by the Federal Reserve Law of 1914. What the author calls the introductory chapter on the currency systems of other nations, is also new. Curiously it comes last in the book.

In both editions there is a useful Bibliography; and each has an Appendix which English readers will find specially valuable. In the 1903 edition the Appendix contained the principal Acts of the United States relating to Currency and Banking, and the classical Notes and Reports of Jefferson and Hamilton. Out of the 207 pages of this Appendix, only 4 pages are reprinted in this new edition. On the other hand, the new edition contains the Aldrich Plan for Monetary Legislation and the new Federal Reserve Act.[1] It is clear, therefore, that owing to the different contents of the appendices, each edition has a value of its own, and both should be retained by libraries. The present edition is issued in larger form, but paper and print are hardly as good.

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[1] It does not give the Aldrich-Vreeland Emergency Currency Act. This Act, which proved so useful in 1914, has only a bare mention in the text (p. 440).

Two general remarks may be made at the outset. It will be seen that the author uses the term currency in much the same way as "Monetary" is used in the style of the American Monetary Commission, to cover banking as well as currency proper. It is not easy to draw a sharp division between the two, in a country where paper money has been so largely used. The point of view resembles that of the business man, to whom "Money" is practically purchasing power, or accommodation. The range of the book is, therefore, wider than might be supposed from its title. The character of the treatment, too, deserves notice. As the author hints in his Preface, it is unusually political. This was indicated clearly enough in the short title of the first edition, "The Contest for "Sound Money." This heading has fortunately been dropped in the present issue, but the trail of the serpent remains in the unaltered text. Political history is, of course, valuable, in so far as it explains why certain measures were taken; but the political standpoint is unfortunate. The result is often to throw into the background the fundamental scientific issues at stake where, as is usually the case, these issues were missed or confused by the politicians. Thus, when we come to the monetary controversies of the last quarter of the nineteenth century, our author is more interested in Mr. Bryan than in Dana Horton or Francis Walker. These latter names are only once mentioned, and do not even occur in the index. Yet Francis Walker was the most influential of American economists, and the author of the principal American work on money of his day; while Dana Horton was a man of singular acuteness who had given his life to the study of the international monetary situation, and was probably the greatest monetary scholar of the time.

Our author's general theoretical position may be judged from his definitions of the phrase he took for his flag in the original campaign. Sound money, as applied to coin, he says (pp. 30, 31) means money wherein the commercial value of the bullion equals its coinage value. Sound money as applied to paper or token money of any kind means that which is redeemable in money wherein the commercial value of its bullion equals its coinage value. Generally sound money means money made of (or unquestionably redeemable in) a commodity which has a stable value in the markets of the world independent of fiat. We may leave these definitions as a matter between Mr. Conant and Professor Irving Fisher. They clearly exclude as "unsound" all the moneys of the world. Where is the commodity, used as money, which has a stable value? What would become of such value as it has if governments, by their fiat, followed the Scandinavian example, and excluded it from purchase for coinage? Of course, the real question is what stability of money means, and by what monetary policy it is most nearly attainable. On this and many other points raised in the famous controversies of last generation, our author does not rise beyond the first impressions of the popular view.

In so far as the historian lacks a firm grasp of essential theoretical analysis, his history is bound to suffer; and the present work amply illustrates this presumption. But Mr. Hepburn has made such an excellent selection of topics, and given such a full and accurate account of the facts, that his book must rank as by far the best history of its subject which exists. The distribution of statistical tables throughout the various chapters makes the book very convenient for reference: though continuous tables might have been given in the appendix. It would have been a great advantage, too, if the appendix to the first edition had been reprinted in the second. With these additions the book would not be very easy to supersede.

Among special points of interest may be noted the terse account of the Colonial and Continental currencies, which puts the essential facts very clearly; and the account of the settlement of the United States Monetary System, founded, like the United States trade policy, on the able reports of Alexander Hamilton. The destruction of the Second Bank of the United States by the rancorous attack of President Jackson is also well told. The result is well summed up by Mr. Hepburn. "Altogether it was a reactionary victory over the "intelligence of the day, and the people paid roundly for it." It is only now that the country is making serious recovery from this deadly blow to its financial power. The changes in the monetary ratio in 1834 and the introduction of divisionary silver in 1853, are other episodes of interest. Our author sets forth the facts very accurately, but not without some theoretical confusion. He seems to think that both the unintelligent adjustment of ratio in 1834–7, and the measure of 1853, in which the United States forestalled the Latin Monetary Union, resulted in establishing gold as the standard. Here we have the common confusion between standard and principal legal tender, which has done so much to obscure monetary discussion and monetary policy. Dunham, speaking in 1853, makes the same mistake, but explains very carefully that it was only so far as the new subsidiary silver coins were concerned that he would "make "silver subservient to gold," page 64. But the men of that day had not the breadth of view of Hamilton and Jefferson.

The history goes on to relate the very unsatisfactory condition of banking in the middle of the century. The variety and character of the notes issued was deplorable. Some were at a discount of from one to fifty per cent. "Bank-note detectors" had to be consulted, to appraise these issues. It was not till the National Bank system was founded by Chase in 1864 that "the bank-note "detector became divested of its useful but contemptible function." The financial purpose of Chase's famous Act is clearly explained; and a very full history is given of the legal tender notes, better known as greenbacks. Then we come to the demonetisation of silver in 1873. This was effected, so far as the United States was concerned, by simply omitting the silver dollar from the list of legal coins, in the revision Act of February 12, 1873. It was alleged that the people of the United States were not aware of the fundamental change in their monetary system thus made; and this is what is meant when men speak of the "Crime of 1873." Mr. Hepburn shows that the question had certainly been raised in the Bill of 1870 which had even proposed to change the standard to gold, and make the silver dollar a subsidiary coin. But it seems certain that general attention was not called to the matter. No one at the time was more interested in monetary matters than General Francis Walker, one of the two American delegates to the Conference of 1878. But he has often assured me that neither he nor his father, also a great monetary writer, had the smallest idea at the time of the change which was being made. One thing is clear. We are not entitled to assume, in discussing such matters, as Mr. Hepburn usually does, that if a man says he wants a gold standard he is in favour of the demonetisation of silver.

The part of the book dealing with the consequences of this demonetisation is naturally unsatisfactory: not so much because the author writes in a partisan spirit, as because he fails to understand the position and the arguments of his serious opponents, and deals mainly with the clumsy and unscientific measures advocated by politicians. No one has condemned those measures, and the whole policy of the United States in "propping up" silver, more vigorously than Francis Walker and Dana Horton. Their position is not even stated. The International Conferences are dismissed in a few pages.

If European readers find this part of the work rather disappointing, they will thoroughly appreciate its later chapters. Here Mr. Hepburn deals briefly but clearly with the great banking reform of 1913–14. He shows the defects in the old system, narrates the work of the National Monetary Commission of 1909, gives Senator Aldrich's plan for a central bank, or Reserve Association, and explains the reasons why it was replaced by the Federal Reserve Act. He leaves us in no doubt as to his views on the general question. As he justly observes, "the dominating power of the Federal Reserve Board "is so pronounced that it, in effect, makes of the system so created "practically a central bank, and needless to add, this is the strongest "feature and best quality of the Federal Reserve System" (p. 412). But even Mr. Hepburn shows a certain timidity as to future developments. He expects that domestic exchange will be cheapened and facilitated by the new system. But he is opposed to attempts "to make all checks worth par everywhere . . . and thereby "make them practically a part of our currency." Why not? The whole phenomenon of internal exchange is surely an anachronism; due simply to the arrested evolution of United States banking. Local exchange would be considered an intolerable nuisance in this country. It only exists in the United States because their banks still have the same local and parochial character, in spite of the size of their operations, as our English banks had in the eighteenth century.

Englishmen should follow more closely than ever the remarkable developments of present-day American banking. The Federal Reserve Act only came into effect in November, 1914; but remarkable progress has already been made under the guidance of the new

Federal Reserve Board. The new financial powers conferred by this Act, taken together with the comparative paralysis of the great European markets, give New York an exceptional opportunity to realize long standing aspirations. The older markets must realize that a new and vigorous rival is in the field. H.S.F.

4.—*Capital To-day—A Study of Recent Economic Development.* By Herman Cahn. x + 313 pp., 8vo. New York and London: G. P. Putnam's Sons. The Knickerbocker Press, 1915. Price $1.50.

There is no economist but Karl Marx, and Herman Cahn is his prophet. This work, written with great assurance and force, starts from the standpoint that all our "paid specialists in political "economy" are either bewildered addlepates like philosophers in Laputa, or opportunist rogues lying for a living: "it would be "foolish to expect or ask the universities to help in undermining "intellectually the class to which belong their financial backers as "well as the bulk of the student body. . . . Scientific economics "never will be taught within the universities while the state remains "a class state, though millions may be familiar with its conclusions "outside. . . . the validity of Marxian Economics is not "impaired because the universities choose to ignore its existence."

The latter day professor "no longer searches for truth, but for "lawyer's arguments in conducting a defence." Whatever those arguments may be the author does nothing to meet them, but merely repeats the charge and abuses the defendant's attorney. He will, in the circumstances, perhaps forgive an academically nurtured reviewer, who may not have grace enough on a single reading of the revised version of this special gospel to forsake his old gods and follow the prophet wholeheartedly. Mr. Cahn complains that in economics as now taught is presented no accepted body of truth, for its teachers profess many differing theories, whereas in the natural sciences there are no opposing schools: he makes the curious remark "we do not read that in relation to . . . Evolution Mr. A. holds "one view, while Professor B. differs from it, and Dr. C. denies "altogether that such phenomena exist." In his view, Karl Marx adopted the natural science method with exhaustive and final success: the one missing feature in Marx is that while he gives a thoroughly scientific "product of thinking," he did not teach us *how* to think clearly, and this defect was supplied by Joseph Dietzgen, who we can only say suffers an undeserved obscurity for such a signal service. Apparently the author considers that the making of many books since Marx has been absolutely devoid of any advance in the science.

The reader will, therefore, expect much. Indeed, Mr. Cahn is a vigorous thinker, with no little power of sustained argument, and although the limitations and final fallacies of Marxism necessarily condition many of his conclusions, it is not always easy to say at what precise point the train of reasoning is first affected by them. The earlier chapters are upon money and its functions, and if he invented them all himself he is indeed a great writer, but if, as appears more probable, he is indebted to the thought of the despised academicians, there is nothing more to be said than a verdict of good work. In the chapter on "Money of Account" there is some real originality, and, for a few who can safely use it, ideas of much value, with an analysis of the present position in the United States which fully justifies the whole book. From 1863 to 1913, while current money has increased at the rate of 1 to 5, money of account has increased as 1 to 53, by the evolution of banking. He has no fault to find with this money—the orderly, legitimate, and gradual accumulation of capital in money form, which is essential to industrial development. The real danger is from "fictitious capital," with all the false interests it sets up. In this connection, the Federal Reserve Act, by cutting down the reserve margin, enables a vast increase in bank-created credit capital to be brought into existence, with the possibility of evil results. The great danger of the day is the ease with which fictitious capital is created and manipulated—that is the "capitalisation" of a specific profit yield above the normal rate of interest on a basis regulated by that rate, so that the paper representing an industrial plant is worth far more than the capital sunk in the plant. The trend towards extreme monopolistic capitalism, not indeed necessarily raising prices, but absorbing all the economies of production for which it stands, and issuing the surplus profit in such stock, is pourtrayed with skill and vigour. The sinister union with the banking machine completes the despotism. But he seems to look forward, as his forerunners have done, to the day when capitalism shall have evolved to the point when it is ready for pure socialism to take it over free from all the troubles and difficulties of competition and multitudinous individualism. The wolf in Munchausen's story ran continually behind the nag and devoured as it ran, until it found *itself* in the harness, being driven.

So far as the Marxian teaching is concerned, there is some slight breaking away from the more rigid labour-value theory. "Profit is "that part of the new product value for which the workers received "no equivalent." It would not surprise us if this book became one of the textbooks of socialism. To students of capitalistic problems, and indeed of all modern economic tendencies, there is some work in it of genuine value. J.C.S.

5.—*Credit, Industry and the War.* Edited by Adam W. Kirkaldy, with a Preface by William Robert Scott. vii + 268 pp., 8vo. London: Sir Isaac Pitman and Sons, 1916. Price 2*s.* 6*d.* net.

This book, published under the authority of the Council of the British Association, consists of reports and other matter presented to the Section of Economic Science and Statistics at the meeting held at Manchester last autumn. Regarded from one standpoint it is true that some at any rate of its contents may be thought ephemeral, dealing as they do with a passing situation. But, on the other hand, it is an obvious advantage to have placed on record the opinions formed by the many experts, who took part in the discussions at the meeting, or in the preliminary consultative work of the committees, on the salient circumstances of such a moment in the life of the nation. It is also possible that, as some melancholy predictions uttered before the war, or at its beginning, have hitherto failed happily of fulfilment, so it may prove to have been premature to have forecast during the first year of this struggle what will happen at a later stage, or to conjecture the precise course of events at the conclusion. Nevertheless the pages of this book, filled with the reflections and advice of a multitude of able counsellors, will, we are confident, possess a permanent value for the economic student. They cannot fail too, we believe, to be of present help to administrators and reformers.

Dr. Scott's presidential address, full as it is of judicial comment and of wise suggestion, reproduced in the first chapter, on the subject of the Economics of Peace in time of War, is followed, in the second, by a report of a discussion on the promotion of Industrial Harmony. Of the various speakers some were more and some of course were less sanguine about the possibility of a peaceful settlement of matters that give rise to recurring quarrels between employers and employed. But such utterances as those of Sir Charles Macara, on the one hand, and of Mr. William Thorne on the other serve, at any rate, to support the encouraging belief, that, if only an opportunity be offered for frank friendly conference between representatives of masters and of men by the medium of an established and familiar system of conciliation, much irritating costly strife could be prevented ; and the need, always present for so desirable a substitute for strikes and lock-outs, will be reinforced by the economic situation which is probable as the sequel of the War. The general course of the discussion also showed that more has been accomplished by such means than the ordinary external public is aware, although the work is far from satisfactory achievement.

The third chapter entitled "outlets for labour after the war" deals exclusively with the important question of the replacement of men by women, and a large amount of pertinent material had been collected by a Sub-Committee, of whom Miss Ashley and Mr. Hitchcock were, we understand, especially active in gathering and sifting information from a variety of industries. The general conclusion reached was this. After twelve months of war three features of the labour market had become very prominent. One was the serious shortage of skilled work-people, a second was the considerable extension of women's employment, while the third, and perhaps the most significant, was the limited extent to which they had hitherto replaced men, in the sense that they were doing work previously performed by the other sex. "Much of the extension of women's employment during the war in industry proper is," accordingly, "in work which is normally done by women and in which the necessities of war have created an unprecedented demand. Other work now done by women is exceptional work which will decline with the advent of peace. But a survey of the whole field suggests that owing to the installation of special plant the proportion of woman labour may be affected." We imagine that the subsequent operations of the Ministry of Munitions, with the attendant necessary "dilution" of labour, may have exerted a marked influence in this direction in the interval that has elapsed since the report was prepared and submitted.

With the fourth chapter we pass to the work of another Committee. That dealt with a topic no less considerable. The effects of the war on credit, currency and finance form indeed a large subject, and offer room, as the chapter proves abundantly, for diversity of opinion on the part of experts. Some indeed of those authorities are in direct collision with one another: as, for instance, on the question whether the issue of the emergency currency has or has not produced inflation. A full account is furnished of the various steps taken at the outbreak of the war to prevent a stoppage or breakdown of the machinery of credit. Views are expressed on the vexed question, often previously debated at such junctures, of the preferable mode of obtaining the funds needed for the prosecution of the War. If, as the balance of opinion inclines, more should be raised by taxation, as contrasted with a loan or loans, than has yet been done, some suggestions are advanced of the direction that the imposition of additional levies might profitably take. An interesting problem, which has since come to the front through the success of actual experience, did not receive explicit attention by the Committee, or those whom they consulted, except in an Appendix by Mr. Drummond Fraser. That question is whether a continuous supply of money by short loans taken up from week to week, or day to day, as the public chooses, may not prove a substitute no less effective for the purpose in hand, and less disturbing to the money market, than the method of long-dated loans of definite large amounts. Professor Foxwell, referring to Mr. Fraser, has recently argued with great force in favour of this practice; and it has been employed in the main by the French Government. It would seem to avoid the danger of inflation that may follow huge subscriptions by banks and other institutions to colossal loans, and it would appear to tap more immediately and securely actual individual savings.

This consideration, however, shows, like some of those raised in Dr. Cunningham's address on "Economic Problems after the War," reprinted in the final and fifth chapter, that Section F, when it meets this year, may be able to produce no less comprehensive and suggestive a new volume, dealing with additional material, or with fresh aspects of former questions, than that now before us. It would receive, we can assure the officers of the section and the council of the Association, as cordial a welcome as that earned by the present book. L.L.P.

6.—*Labour in War Time.* By G. H. D. Cole. viii + 316 pp., small 8vo. London: G. Bell and Son, 1915. Price 2*s.* 6*d.* net.

In this little book, together with other material, an explanation and apology, if not an excuse or justification, is put forward for the behaviour of some sections of the British working classes that has aroused unfavourable comment. They have caused grave anxiety to responsible statesmen concerned for the energetic conduct of the War. They have begotten anxious qualms in sympathisers with the legitimate aspirations of labour leaders. They are the object of a suspicion, confined though it be to narrow limits, of the patriotism of our working-men. With praiseworthy candour the author does not hide his personal views, although he aims, we imagine, at being for the most part a mouth-piece of the opinions of those whose cause he has espoused. No one, we believe, will question the punctilious care with which he has collected apposite material from original sources, nor would it be easy to impugn the dexterity of his statement of the case advanced. It certainly deserves attention. He has thrown a needed light on points previously obscure. He has revealed reasons more or less substantial for grievances that might seem trivial or shadowy: and he has suggested some directions at any rate in which remedies for misapprehensions or disagreements may be sought. But we nevertheless find it impossible to endorse his general argument or to acquiesce in what we understand to be his reading of the situation.

If we interpret him aright, he contends that at the outset of the War Labour was caught off its guard by Capital which took unfair advantage of the natural wish of Englishmen to help their country by all efforts within their control or capacity at an unexampled time of serious crisis. A sly powerful enemy, so Mr. Cole seems to maintain, sought at once to place and keep an ancient foe in a position of inferiority, and it tried to wrest to its own advantage opportunely what had been slowly guaranteed to its opponent by steady energetic pressure on its part. The workmen, gradually awakening to the awkward situation in which they were thus adroitly placed, have, by stages, distinguished in this account as four in number, tried with a varying measure of success to recover the lost ground. In the matter of the prevention and relief of distress at the beginning of the War, in the subsequent attempt at a limitation of prices and a restriction of profits, in the successive settlements of wages, and in the final organisation of industry, they have made endeavours which have caused no little friction, and have invited much complaint. But their action has grown less ineffectual for their purpose as their plans have become more violent and candid. They have thus frankly asserted their class interests in the face of the specious but hollow plea of the country's needs.

Such is Mr. Cole's main argument as we read his book. We gather that he is not sanguine that when the European struggle is over, that "class-war" which he treats as inevitable, and is himself ready to welcome, will or can be resumed at the point reached in 1914; and international common action in the labour world has, he admits, been disappointing at this testing juncture. Yet he would hold that in this country labour should have been more, not less, assertive of its claims during the stress of War, and that its acknowledged leaders, by their efforts to smooth relations with employers, or to postpone or prevent costly disputes, have betrayed, or at least imperilled, the fundamental interests of their followers.

Expedients therefore for increasing the prompt output of necessary war-material should apparently be suspect. They should be reluctantly admitted, severely scrutinised and jealously restricted. Of course mistakes of tact or judgment may have been committed in the handling of the men by employers, by trade unionist officials or by Ministers and their subordinates; and these may be responsible for lurking suspicion or open collision. But Mr. Cole, as we think, requires us to deny to capitalists and labourers alike an adequate proportion of that over-ruling sense of patriotism which, we prefer to believe, is shared by the large majority of both classes; and he seems to find a pleasure in entertaining, and a duty in enforcing, the gloomy repulsive creed which places class antagonism above patriotic co-operation. This general attitude, we venture to pronounce, detracts from the value of his treatment of some special points, such as women and child labour and unemployment, on which he furnishes interesting information and offers more unbiassed commentary. L.L.P.

7.—*Arbitration and Conciliation in Australasia. The Legal Wage in Victoria and New Zealand.* By Mary Theresa Rankin, M.A. Edin., Carnegie Research Scholar; with an Introduction by J. Shield Nicholson, Sc.D., LL.D., Professor of Political Economy in the University of Edinburgh. 192 pp. 8vo. London: George Allen and Unwin, Ltd., 1916. Price 5*s*. net.

The numerous uncritical and optimistic reports on the results of the Special Board system of Victoria have rendered desirable a careful study of the facts such as Miss Rankin has attempted in this volume. The first two chapters on "Wages Boards of Victoria" and "Conciliation and the Principle of Arbitration in State Regulation of Wages" are admirably lucid, and the survey of the legislative history of New Zealand is, so far as we can judge, accurate and fair.

The statistical and critical chapters are not so satisfactory. Conclusions are drawn from inadequate material and the statistics presented are inaccurate.

On page 100, a table is given dealing with wages and apprenticeship in the Clothing Trade. Taking the year 1911 (the latest to which the report refers) we find 22*s*. 6*d*. stated as the "mimimum wage" instead of the "minimum female wage." The "number of apprentices" is given as 2,508; this is the number of female apprentices and improvers. The percentage of apprentices is given as 38·8; this is the ratio of female apprentices and improvers to total female workers. The average adult wage is given as 25*s*. 2*d*.; this is not even the actual average wage of adult female workers, but is the average earned by adult women exclusive of piece workers. The table contains no particulars with regard to the 1,385 male workers in the trade included in the (incomplete) wage return.

The writer then goes on to state that "the effect of the minimum wage has been to give the whole trade over into the hands of women workers. The rates fixed for males, combined with the high rates generally, made this adjustment economically necessary" (p. 102). This statement is, quite rightly, contradicted on p. 103, where we are told that "in spite of the refusal of orders owing to the scarcity of female workers, the increase in male workers in 1911 was only 473 on those employed in 1898." This increase of 473 was, in fact, an increase of 40 per cent.

On p. 81 we are told that "there are three possible sources from which an artificial rise in wages may be met. Firstly, it may be met from the Wages Bill itself, either by the reduction of wages to one level or by the increased employment of juvenile or female labour. Secondly, it may be met from profits, in which case there would be evidence of restriction and non-expansion of industry. Thirdly, it may be met by a rise in price to the consumer." Such a statement wholly ignores the possible increase in output and profit from increased efficiency due to better feeding of the underfed, firmer supervision of the lazy, improved methods of organisation, diminished waste, and last but not least, the elimination of the unfit employer.

"A careful consideration of Victorian experience forces the conclusion that the deeper the depression and larger the supply of labour in any trade, the more harmful is the introduction of a legal rate. *At such a time it operates entirely in favour of the more competent worker by excluding the less competent from competition*" (p. 70). The italics are ours. Such a result is, in our opinion, the most desirable that can be suggested. The problem of the unemployed would become an educational problem, and industry would be freed from the worst drag that can be imposed upon it. C.E.C.

8.—*English Field Systems.* By Howard Levi Gray, Ph.D. viii + 568 pp., 8vo. Cambridge: Harvard University Press, 1915. Price $2.75 net.

As the result of original research, at once indefatigable and discriminating, Dr. Gray has, in this admirable volume of Harvard Historical Studies, made a large and notable emendation of an important but obscure part of English Economic History. He has, as we think, been completely successful in demonstrating the need for re-writing at greater length with a different moral a narrative compressed unduly by leading authorities, and accepted in the shape thus given too lightly, without further questioning, by their reverential followers. He has shown once more in this department of learning that fresh assiduous inquiry may serve to disclose neglected by-paths or even compel the old main roads to be relaid on altered lines. He admits frankly that in the particular area he has chosen for investigation the method that must in the main be followed is the hypothetical reconstruction of earlier periods from data accessible at later times. This is a procedure attended at the best by a measure of uncertainty; for, as Maitland once aptly summarised the situation, given the result, we have to argue back to the cause, or causes, and infer the process conducting from the one to the other. The danger of reading into the past what may be strictly true only of the present is an obvious risk; and Dr. Gray does not conceal the peril of error or distortion. But he has proved abundantly that he is both a cautious researcher and an acute unbiassed interpreter, and again and again throughout his treatment he refrains from pushing his conclusions beyond the limits set by the character of the evidence obtained, and is content with a negative argument where positive inference is not justified. He enables his readers to know and appreciate for themselves the foundations on which his reasoning rests, and, with their active aid, he appraises the varying value of the data used. Thus inspired and directed he begets confidence; and it is noteworthy that he draws special attention to such late material as tithe-maps and enclosure-awards. These can be employed with less difficulty than more remote unfamiliar records as part, at any rate, of the testimony to which appeal may be made, when we wish to ascertain the nature of by-gone conditions, and to delineate the course of previous transformation.

Of the novelty and importance of his main contentions there will be no question. The accepted theory of a two or three field system as the general type of mediæval land tenure and cultivation needs, he argues, to be revised. Nor, he holds, was enclosure of the open fields, held and worked in common in scattered strips, the only mode practised of farming advance. Enclosure too took different shapes, and met with a response more rapid and less hostile in certain circumstances than in others.

Professor Gray is able to distinguish different portions of the country, where different original conditions were existing and varying successive changes then occurred. The two or three field system thus found its home in "a large irregular area lying chiefly in the midlands," and "in the counties farther towards the south-east, the south-west and the north-west," different systems have been found, "Whatever the dissimilarity between these, they have shown agreement in not dividing the unenclosed arable of their village fields into two or three parts to each of which one-half or one-third of every tenant's parcels were assigned." Such were the Kentish and the Celtic systems; and with their greater elasticity they in their turn offered less stubborn opposition to enclosure than the rigid midland types. The custom, common to both, of subdividing land among heirs, might, of course, produce "intermixture of the parcels" of the tenants' possessions, but, on the other hand, the "symmetrical" arrangement, connected, under the midland system, with a "three-course rotation of crops and three large fields," was replaced by a more adaptable plan, admitting some degree of compactness in the holdings. While in the south-east Roman influence may have endured, in the south-west, the north-west and the north, Celtic agrarian usages probably continued. Both were effective obstacles to the Germanisation prevailing in the midlands. The measure characteristic of the Kentish system, the "jugum," recalls Roman measurements of land; the small townships of the other parts of the country, together with the "runrig system," indicated Celtic survivals.

Our author throws interesting new light on the real distinguishing characteristics of the last named system, and he also draws an instructive contrast between two phases in a process of development, extending from the "unenclosed open waste, with parts transiently improved for purposes of tillage," to the modern enclosed farm, cultivated, with alternating cereals and grass or roots, in accordance with the enlightened principles of "convertible husbandry." Thus viewed, the "reduction of the waste to open-field tillage" was at one time undoubtedly an improvement; but at another later period, it might, as it did, delay the subsequent advance towards enclosure in the complete sense of the word.

Nevertheless the two or three field system, marking the "Germanisation" of the midlands, did not stand still. A change from a two to a three field course was itself a move forward, and it is probable that the former system usually preceded the latter and that the change was generally effected in the thirteenth and fourteenth centuries in many parts of the eastern and northern midlands. A second change, between the middle of the sixteenth and the middle of the eighteenth centuries, was more significant but has received still less attention. This was either the subdivision of two fields into four, three of which were tilled annually, or the transformation of regular into irregular fields, with improved tillage and frequently considerable piecemeal enclosure. Such often occurred in the case of forest land, or was found in river valleys, and in Herefordshire, before the days of parliamentary enclosure, the open arable fields had shrunk until they were not more than "two and a half per cent. of the total area" of the county. In the eastern midlands the tillage of the fields, as they lay still unenclosed, was improved in various ways, by subdivision or other means.

From the brief summary we have given it will, we hope, be seen that Dr. Gray has substantiated the claim put forward in his Introduction; for he has furnished a very valuable contribution at once to "our knowledge of the settlement of England and to the history of English agriculture." His work, we are confident, will be henceforth embodied in all complete authoritative English Economic Histories. L.L.P.

9.—*Our Food Supply—Perils and Remedies.* By Christopher Turnor. 171 pp., 8vo. London: Offices of *Country Life*, 1916. Price 2*s.* 6*d.*

Issued as one of the "Increased Productivity Series" Mr. Christopher Turnor's new volume will command attention as coming from an author who has proved his ability to handle a subject of immediate interest in these times, and his zeal for the practical improvement of the conditions of agricultural production. As is pointed out in the Foreword, written by the Hon. Edward Strutt, it is not necessary that the many suggestive conclusions advanced should be accepted in their entirety to appreciate the value of this contribution to the timely discussion of the problem submitted. That is in brief how far, and under what economic limitations, could the home land of Britain profitably feed more fully than to-day the growing millions of consumers resident on its strictly limited area. The author urges as his first reform the restoration of more land to the plough, and the reduction of the surface under permanent grass, and he can no doubt quote high authority for the greater potential production of arable land intensively cultivated for carrying stock as well as for growing grain. He desires to see more intensive farming, smaller units of culture with larger capital applied, reduced areas of estates with a greater practical part played by owners, more facilities for tenants to purchase their holdings, development of credit systems, fairer taxation and more widely spread education among all classes interested in the land. Without any disposition to dissent from this programme—which is mainly one to be discussed in economic, political and practical agricultural circles—a purely statistical critic may be allowed some regret—that a fuller dissection and analysis has not been made of some of the tabular contrasts Mr. Turnor makes between British and Continental farming. The danger of complete reliance on some of the foreign estimates of production has often been pointed out, and the confusion of clear distinctions between gross and net production in the calculations of some foreign countries must not be overlooked in counting the cost of some of the changes suggested in our own methods. Comparisons, too, would be more exact if somewhat like areas (where the yields of crops are appealed to) were contrasted and the varying conditions, physical and social, allowed for more fully. The density of the populations compared vary greatly, and the relative welfare enjoyed by the cultivators of the soil may not be altogether against the British system.

None the less, it is clear that there are features of importance where the British farmer may learn from his continental neighbours, while one may hope that such arguments as Mr. Turnor puts forward on some wider issues may reach the ears of our statesmen and financiers, and lead eventually to the provision of that larger available capital which a more arable system would demand. We need in any case a more rapid appreciation of what agricultural education can effect in amplifying the net out-turn of the soil of our own country. P.G.C.

10.—*Le Troupeau Français et la Guerre. Viande Indigène-Viande Importée,* par Alfred Massé, ancien Ministre de Commerce. xx + 382 pp., 8vo. Paris: Librairie Agricole de la Maison Rustique, 1916. Price 3 fr. 50 cents.

The war of 1870 made serious inroads into the French cattle-herd, and the position was not re-established till ten years later. A further severe decline took place in 1905, but after 1908 the upward course began again, and in 1912 the herd numbered 14,705,900 head. The sheep flock, on the other hand, is only half what it was in 1852, and in 1912, included 16,467,700 head; this decline is due to the development of intensive culture. Finally, in 1912 there were also 6,903,750 pigs. The slow growth of the cattle herd was made able to provide an increasing supply of meat through the measures taken to improve the condition of the animals. Official statistics gave the consumption of meat as very slightly over 57 kilos. per head of the population in the year 1909, but M. Massé agrees with other authorities in thinking this estimate excessive; his own figure is 42 kilos. per head per year or 1,661,000 metric tons in all, of which 850,000 tons are beef and veal.

Cattle prices in France are determined by those obtained at the market of La Villette in Paris, which not only serves the metropolis, but, as all the railways converge on Paris, attracts the cattle from the rearing districts, and distributes them again over the country. Small and middle-class cattle rearers cannot afford to go personally to La Villette to sell their cattle, and breeders on a large scale find themselves outmatched in bargaining by the wholesale butchers who are experts in the complicated system of buying cattle by live weight without weighing and less the hide, horns, &c., which fall to the share of the wholesale butcher. Cattle are, therefore, sold either on the farm or at local fairs to dealers or commission agents who bring the animals to Paris for sale, and fix their purchase price according to the latest La Villette rates. The wholesale butchers buy part of their supply locally through agents or at the railway stations, and use this reserve to reduce the market prices. The wholesaler has to give the retailer a part of his advantage, as retail prices are more stable, but the producer does not benefit. The net result is that cattle prices have been practically the same during the last ten years, and while the price of meat has sensibly increased the agriculturist has derived no benefit.

The meat ration, which is practically a beef ration, of the French soldier is from 300 to 500 grammes a day: the higher figure is equivalent to 183 kilos. a year, producing a deficit in supplies of about 284,000 tons. Owing partly to military requirements, partly to the invasion, there was a serious slaughter or other loss of animals in the early months of the war. Measures of conservation were taken, but still at the end of ten months there was a loss of 2,500,000 head. Various figures also indicate a decline of 20 per cent. in civilian consumption. Naturally there has been a rise of prices, which may be summed up in the following table showing the various stages of the sale of a four-year-old ox:—

	November, 1914.	May, 1915.
	frs.	frs.
Received by farmer	760	880
Agent's expenses	22	22
Received by agent	880	1,000
Wholesale butcher's expenses	59·52	59·52
Received by wholesale butcher	1,101·84	1,287·34

The farmer takes four years to turn his money over, the agent a week, and the wholesaler three or four days. Retail prices in Paris also rose from 40 to 100 per cent.

A Special Commission has estimated that at the end of the war the deficit in the native meat supply will be not less than 400,000 tons a year. The necessity of protecting the cattle herd is thus obvious, and the principal means adopted to this end has been the importation of frozen meat for the use of the troops. When peace is established not only France but all the belligerent countries will have to consume much greater quantities of frozen and chilled meat than in the past, and M. Massé finds the main difficulties not in the capacity of the cattle-rearing countries or of the freezing-works situated therein, but in the supply of insulated ships to carry the meat, and of cold stores in the consuming countries. A considerable part of the book is devoted to the examination of the proposals of the French Government to ensure a part of its supplies by the equipment of French ships, and by the conclusion of long-term contracts lasting until the cattle-herd shall be re-established. It is not necessary to summarise this discussion since the original proposals have now been abandoned for other measures. Of more general interest is the proposal that after peace is made the central cattle markets should be replaced by district abattoirs in the rearing or fattening districts, where the by-products of the slaughterhouse would be fully utilised, and from which the meat would be distributed over the country in chilled condition by means of specially refrigerated railway cars. H.W.M.

11.—*Monographs on Agricultural Co-operation in Various Countries.* Vol. I., 1911, 451 pp., 8vo. Vol. II., 1915, 213 pp., 8vo. International Institute of Agriculture. Rome: Bureau of Economic and Social Intelligence. Price 3.50 francs each.

The International Institute of Agriculture in the first of these volumes has issued a revised edition of the monographs on the organization ("economic, administrative and political") of agriculture in the United Kingdom, France, Germany, Belgium, Holland, Denmark, Norway, Sweden and British India, which appeared in different numbers of its monthly Bulletin of Economic and Social Intelligence; and a new monograph on Russia is added. The second volume aims at covering the same ground for Argentine, Austria, Hungary, Italy and Switzerland. The method of presentation of the subject is in general excellent, and each study is preceded by a statement of essential data, demographic, agricultural, and other, as well as by a list of the authorities upon which it is founded. As the subject of agricultural organization in Europe has been rather obscure and difficult to master for English students, owing to the dearth of trustworthy and accessible literature, these two handy volumes are extremely welcome. In view of the prevailing conviction that "something" must be done to secure a great permanent increase of agricultural production in these islands, and of the problems which will thus ensue, their information acquires increased value.

Even specialists in England have probably only a faint impression of the revolution which has been effected within the last thirty years in the organization of agriculturists in the principal countries of Europe. Except in Great Britain, the steady movement towards organization for the representation and protection of their general interests as a class, as well as for their special business interests, such as for agricultural science, production, distribution and banking, appears to have been in active progress. It was also promoted by governments, which either placed farmers willy-nilly in self-governing, strictly vocational organizations or made it their obvious interest to attach themselves to such bodies. The chambers of agriculture established in Prussian provinces in the years 1894–99, and copied elsewhere, afford an example of the first type of organization. Every landholder assessed for land tax at from a few pounds upwards (*e.g.*, 3*l.* 15*s.* in Westphalia and 4*l.* 10*s.* in East Prussia) necessarily belongs to the chamber of his province, which is directed by agriculturists elected by district councils, and supported by rates established by the chamber, but collected free of charge by the ordinary revenue officials as well as by State grants for specific purposes. As the fully representative organs of agriculture in their considerable areas they are consulted by the State as a matter of course with regard to any measures affecting agriculture, and are the usual agents for the execution of State policy as regards agriculture. Within the short period of their existence they have developed into institutions of great prestige and activity. They maintain travelling technical advisers for the main branches of agriculture, for building operations, insurance, general agricultural economics; labour exchanges; bureaux of information (as to prices, markets, financial standing of customers); dairy schools, forestry, seed-growing, fruit-growing, poultry breeding institutions, experiment and testing stations; cattle selling agencies; agricultural book-keeping and auditing departments, and so forth; and they work in the closest union with the provincial co-operative organizations, which often have their extensive offices in the same large building. In general conception, these chambers form the counterpart to the chambers of commerce, which are also statutory bodies. Examples of the other system of the vocational organization of agriculturists are to be found in France, Belgium, Holland, Denmark. In some European countries the ministries of agriculture and agricultural policy may be said to be directed by farmers as regularly organised in local, provincial and national groups. The guiding motive in this State impulse towards organization, which is everywhere of comparatively recent date, has been the recognition of the necessity for bringing agriculture from an economic, technical and political standpoint into line with industries and trades that have to maintain themselves in modern national and international markets. As regards the United Kingdom, it appears that only in Ireland has any attempt been made by the State to solve this fundamental problem of vocational organization.

The remarkable changes and achievements in certain important branches of agricultural production resulting from this general scheme of reconstruction are illustrated in these volumes. In some western

States the dairy industry, for instance, has been revolutionized. Denmark established its first co-operative dairy in 1882; in 1909, 86 per cent. of the landholders were attached to 1,058 such dairies which, excluding the area within the immediate influence of Copenhagen with its large fresh milk requirements, practically monopolized the milk output of the country. It is a noteworthy achievement of progress in production that a country half the size of Ireland should have succeeded in raising the value of its butter exports sevenfold (from two to fourteen million pounds) since 1882. Holland adopted the same methods in opening its first co-operative dairy in 1886, and such dairies now produce about four-fifths of the immense (and greatly increased) dairy output of that country. Belgium has over 600, and Norway 700, co-operative dairies, while the value of German co-operative dairy production approaches 25 millions sterling, and Ireland will soon be producing in its creameries goods to the annual value of three and a half millions.

The Irish school of agricultural economists does not tire of insisting that in these islands farmers are alone among producers in acquiring the means of production at retail prices and in selling their products at wholesale prices. In most continental countries farmers have advanced well on the road to emancipation from such a crazy situation. Fodders, fertilizers, seeds, machinery, implements, electric light and power, coal and other commodities required in production are directly procured to an ever-increasing extent by their own organizations. We hear of a single organization of farmers' societies in one country which bought at preferential rates in one year 620,000 tons of phosphate flour and of another which supplied in the same period 120.000 tons of purified potash salts to its members. Apart from their dairies, which sell independently on a large scale or form central agencies for the purpose, foreign farmers have made great progress in combining for the sale of cattle, meat, corn, eggs and other produce, as well as for the application of manufacturing processes to primary products (*e.g.*, potatoes, sugar, pig-meat).

But the most signal success has been achieved in combination for banking purposes. Support for the contention that the agricultural industry under modern conditions requires a special form of banking organization suited to the peculiar character of the conditions of agricultural production and distribution, and capable of appraising the business capacity of agriculturists, is not readily found in a community so thoroughly urbanized as the British and so comparatively poor in men who devote systematic thought to rural economics. Yet the common experience of other countries in the last generation indicates the validity of the contention. Germany now has 17,800 rural credit banks, Austria, 11,500; India (two years ago), 17,300; Russia, 14,000. In France, Italy, Roumania, Japan their numbers run into many thousands, while in small areas like Holland there are 800, both in Belgium and Serbia (in 1911) only about one hundred less. The need has appeared more insistent since the beginning of this century: in 1901, there were some hundreds in

France; slightly over 100 in Holland, while Russia had perhaps one-tenth of her present number and Germany had not half of her present total. The remarkable movement outlined in the Indian monograph dates only from the year 1904.

These agricultural banks did not spring up everywhere in Europe because ordinary banking facilities were deficient. In Holland, Germany, Switzerland, for example, ordinary banking facilities are as sufficient as in the United Kingdom (and there are other important sources of credit which we lack). Taking the mere external test of number of banking offices it is not exact (as often claimed) that this country shows a larger number of offices per head of population than any other country; and it is far less exact when one considers that in 1915 24 per cent. of the offices in England and Wales, and 40 per cent. of those in Ireland are only open on certain days (fair or market days, certain hours on stated days, &c.). In other countries a banking office means an office with regular staff open daily, so that its effective value as agency for credit is likely to be far greater. Although in France, Germany, Austria, Hungary, branch banking has greatly developed, few banks in Belgium, Holland, Switzerland have numerous branches; and in all these countries banks or bankers working only in one locality or district remain very numerous. It might have been expected that from such agencies, numerous in country centres, farmers, if only by reason of proximity, freedom of action of such bankers, and their relative good knowledge of agricultural matters and persons, could have secured credit on suitable terms.

The essays on Denmark, Sweden and Norway show that co-operative credit institutions have not taken root in these countries although other co-operative activities flourish. For Denmark and Norway there is a ready explanation: in both countries the banks are usually quite small undertakings, confining their business to their localities, and numerous local public savings banks empowered to invest their funds at their discretion do, in fact, lend largely in their own districts. Denmark with an area one-eighth of the United Kingdom has over 500 local savings banks (of which 400 are in country places), while the capital of 60 out of its 140 company banks does not exceed 100,000 kronen. Norway also shows over 500 savings banks, and its 108 company banks have not a total of a dozen branches. Branch banking predominates in Sweden, but the savings banks (440 in 1913) lend largely on personal security as well as on mortgage. J.R.C.

12.—*The Principles of Rural Credits as Applied in Europe and as Suggested for America.* By James B. Morman, A.M., with an Introduction by John L. Coulter, Ph.D. xviii + 296 pp., 8vo. New York: The Macmillan Company, 1915. Price 5*s.* 6*d.* net.

Within the last half-dozen years, and particularly since 1912 when each of the then contending parties at the presidential election inserted a plank in their platform pledging the party to rural credits legislation, agricultural credit has evoked in the United States and

Canada an almost bewildering amount of enquiry and of legislative effort. Apart from books, essays, pamphlets, reports from diplomatic representatives, there have been numerous governmental commissions which during this period have conducted enquiries at home and in Europe. The information oral and documentary obtained, for instance, by the two American Commissions which visited Europe in 1913 covers, as eventually printed, an immense volume of over 900 folio pages. The present book is an attempt to present in a condensed form the principal results of such governmental and other enquiries for the benefit of the ordinary American citizen, and to apply the knowledge for formulating a credit system suitable for the present needs of American farmers. The author states in his preface that the sources have been freely used : indeed, he appears in some instances to have incorporated in his own text passages from other volumes (*e.g.*, pp. 139–141, pp. 93–94).

The first half of the book, which deals with the organization of rural credit in Europe, contains on the whole a very readable exposition of the various types of institutions for providing farmers with facilities for long-term (mortgage) and short-term (personal) credit. But the reader is puzzled in many places. Thus, he is informed that in France " the objects of local co-operative societies " are to promote, guarantee, facilitate and meet the agricultural " operations and requirements of their members " ; that " thus far, " however, the law had created an instrument of credit only without " a money discount to correspond therewith ;'" and that " if the " members choose to organize on the principle of limited liability " all the members are not responsible for a debt which any one of " them may have contracted towards the society." A paragraph towards the close of the discussion on the Schulze-Delitzsch banks states, among other things, that they usually charge 4 to 5 per cent. as interest, that the security of depositors' money is based on the unlimited liability of 92 per cent. of all members, and that they are subject to audit by officials of their central banks. All this is inapplicable to the Schulze-Delitzsch system, but true for the 17,800 rural banks of the Raiffeisen type. It is asserted later that while some of the rural credit societies in Europe have a membership of three to four thousand " the smallest usually have from two to " three hundred." Yet the average membership of rural credit banks in Germany is 98, in Belgium, 36 ; in France, 48 ; in Holland, 70 ; while in Austria the high average of 130 is due to special developments in Galicia and Bohemia. The share system of renting farms is stated to prevail to a large extent in Europe ; and the value of the bonds issued by the Prussian rural mortgage associations (*Landschaften*) down to 1912 is given at 750 million dollars, which is a very serious understatement. Two official censuses are incorrectly dated—in the one case, the figures are made to refer to 1913 instead of 1907. Curiosity is awakened, in the chapter on personal credit for the landless farmer, by the section headed " How Great Britain " Aids Farm Labourers," but it contains no reference of any kind to any credit facilities !

The high importance of agricultural credit in the United States when, in 1910, 54 per cent. of a population of 92 millions was classed as rural, and there were $6\frac{1}{3}$ million farm holdings, is obvious. Existing conditions are recognized as unsatisfactory. An official enquiry in 1913 showed that the average nominal rate of interest in 30 American States for short loans to farmers against collateral or personal notes was 8·4 per cent., the lowest averages for single States being 5·9 per cent. in New York and Pennsylvania. For mortgage loans on farm property the nominal average rate of interest was $7\frac{1}{15}$. But this does not include the charges for clearing titles, abstracts and other items. As such mortgage loans are wont to be made for period of three to five years, and as in case of renewal, the ordinary commission and renewal charges fall due, the actual cost of mortgage loans tends to be much in excess of the nominal interest charge. Mr. Morman shows how the American farmer weak in capital, and notably the tenant farmer, is greatly exploited as compared with the merchant or manufacturer, more particularly by the gombeen man or the money-lending country merchant. In this connection he notes that the number of farm tenants is very large (2,354,676 at the 1910 Census), constituting 37 per cent. of the landholders, and remarks that "farm tenancy becomes serious from the standpoint of credit."

Company banking enjoys an absolute predominance in the United States and Canada, but while in the latter country branch banking prevails several of the banks having at least 300 and others over 200 branches apiece, American banking may be described as localized in character. National banks (about 7,600 in number) may not open branches, and the State banks or those organized under the laws of their particular States, which number over 15,000, have not found it advantageous to extend their operations by this means over the State territory. American farmers do not suffer, therefore, from the special drawbacks of a highly centralized and impersonal banking system. They transact the bulk of their credit business with the State banks, partly owing to the disabilities of the National banks in the matter of making advances on land mortgage security. Both in the United States and Canada, however, despite the presence in every place of the slightest importance of one or more banking agencies of the standard type, it is found that such banks, mainly designed to meet the needs of commerce and industry, are unable to do justice to the needs of farmers. Their shortcomings have become more conspicuous since American farmers have begun to encounter the difficulties of their fellows in the older countries, and have been obliged to sink more and more capital in their farming operations.

In harmony with the writers and the commissions whose publications he has examined and condensed, Mr. Morman suggests that the co-operative organization of credit is the appropriate solution of the problem. To begin with, farmers must organize their entire body of interests, political, economic and technical, as completely as has been done in the States of the European continent. An educational propaganda should be set in operation by the Federal Government for the promotion of agricultural co-operation and credit, while the single States should act by passing legislation affording legal recognition and facilities for such organizations of a genuine character (as has already been done in 17 States of the Union and in parts of Canada), by protecting farmers against a serious condition, by making long-term reducible loans on first mortgage at moderate rates, and by introducing generally a more simplified and less expensive system of land registration.

Certain of these suggestions might perhaps be profitably adopted for the United Kingdom. J.R.C.

13.—*Les Méthodes Allemandes d'Expansion Économique* par Henri Hauser. ii + 280 pp., small 8vo. Paris: Armand Colin, 1915. Price 3 fr. 50 cents.

The author of this Essay apologises for haste or incompleteness due to the accomplishment in weeks of a task that at more peaceful times might have demanded and received as many months. But he has made an effective contribution to the literature begotten by the War. Nowhere else have we seen so luminous and persuasive, so comprehensive and compact, a survey of the deliberate, adroit and thorough system by which the German people had, before recourse to armed aggression, waged a commercial and industrial campaign, seeking and achieving an immense "expansion." Their peaceful "penetration" bade fair, in fact, to win a world-wide triumph: and it was accompanied on occasions by an employment of the "frightfulness" that has disfigured afterwards their military and naval operations. Professor Hauser's account of this persistent strenuous activity is the more informing because in his successive chapters he shows clearly how each separate plank of the whole programme was cunningly dovetailed into the remaining portions. A policy of "dumping," for example, which might at first in some instances at least furnish possible rivals with cheap materials, and meet with an incautious welcome at their hands on that account, was subsequently guided by supplementary skilful engineering along channels designed to bring the final benefit to German manufacturers and traders, and to cause damage or destruction to their competitors in other countries beguiled by blindness or neglect into predicaments from which escape became impossible. The Cartels, practising so jesuitical a policy, were but one of many ingenious instruments of economic warfare; and over all the effective weapons used the competent supervision of the bureaucratic State has been throughout conspicuous, playing an apt rôle unparalleled in other lands.

The essay is divided into three parts, with an introduction and conclusion. In the Introduction the rapidity and magnitude of the economic growth of Germany are duly emphasised. From a poor, industrious and thrifty nation Germans had significantly acquired an appetite for luxury which their advancing wealth had enabled them to gratify in fuller measure with each year that passed. Manufacturing industry had wrested the predominance from agriculture. Works and buildings had been planned and pushed to completion with a long view cast towards a future of more considerable prosperity.

The assiduous commercial traveller was pushing everywhere the profitable sale of goods suited precisely to the capricious wants of various customers: and the Germanisation of the world's business was proceeding with an irresistible momentum. Such was the position in 1914, and the marvellous success achieved was not undeserved. The rapid increase of population, the habit of industry, the instinct of obedience, the aptitude for associated work and the appreciation of scientific knowledge, were among the causes of the satisfactory results produced. But in the first part of the Essay we discern a less encouraging and more unpleasant aspect of the situation. The imperative necessity of the expansion is there plainly demonstrated. Germany could not afford to stand still content with maintaining her achievements. Over-production and over-capitalisation caused a pressing demand for the control of larger markets for the sale of her finished goods and of independent supplies of the raw materials required. In the second part one reason for this insatiable hunger is supplied. It is furnished by the hazardous partnership of German banks in industrial and commercial ventures, and the extravagant proportions reached in consequence of this and other influences by unsubstantial varieties of credit. Coupled with these as factors of the expansion have been the action of the Cartels, the adroit grant of special transport concessions to exporters, the large development of railways, canals, and shipping, and the ubiquitous intervention of expert government officials. In the third part the conquest of markets, and "penetration" in its dual commercial and industrial aspects, are discussed; and in a Conclusion Professor Hauser properly discriminates between those characteristics of German policy which should not, he thinks, be copied, at any rate in their integrity or excess, by other nations, and those which he holds may be imitated with advantage. L.L.P.

14.—*Commerce and Industry.* By J. Russell Smith, Professor of Industry in the Wharton School of Finance and Commerce, University of Pennsylvania. viii + 596 pp., 8vo. New York: Henry Holt and Co., 1916.

The author of this work has long been known as one of the ablest and most original students of geographical conditions as they affect commerce and industry, and the present volume is, in fact, to a great extent a reproduction in an abridged form of a work published by him in 1913 under the title *Industrial and Commercial Geography.* In the preface to the volume now reviewed, he states that he has "attempted to explain how man's industries are determined by his environment." The geographical factor is accordingly made prominent throughout, and has at least formally governed the arrangement of the contents. Excluding an introductory chapter on "Our Changing Environment," the book is divided into three parts, the first headed the United States, occupying nearly half the volume; the second dealing with Foreign Countries, and the third bearing the general title World Commerce. But though every opportunity is taken to give prominence to geographical influences, and that with great insight, the real subject in Part I. is not the geographical features of the United States, but the industries of that country, and it is these that furnish the headings for the chapters; and even in the briefer treatment of other countries we again and again find that it is the industries rather than the surface that are the topics dealt with. In the third part, there are some interesting chapters showing special knowledge of the organisation of ocean traffic. There is a short chapter showing good judgment on the Suez and Panama Canals, but nothing is said about the risk of blocking to which it was anticipated by some that the latter canal would be exposed when opened, an anticipation which experience since the opening has proved to be correct.

That matter of statistical interest should occur in a work of this nature was to be expected. An appendix of 24 pages contains a number of statistical tables, all dealing with matters of the first importance in connection with the subject of the book. One of these is an elaborate table filling two pages, giving international comparisons under twelve heads. Another gives tables of the total value of exports and imports of nine countries classified under the heads edible grain, meats, dairy products, poultry and eggs, vegetables, fruit and nuts, sugar. coffee and tea, fish and other. Unfortunately, the author does not in every case quote his authorities for his figures. A feature of this appendix indicative of the purpose of the volume as a text-book is the insertion in some cases of notes, in others of questions at the heads of the tables. Thus, he remarks at the head of the table last mentioned that "the status of the United States in food supply will be a surprise to many," though why it should be so is not very clear. It shows that the U.S.A. produced or was estimated to produce, apparently in 1913, 23 per cent. more edible grain, 20 per cent. more dairy produce, 6 per cent. more meat than it required, but that the supplies of fruit and nuts, fish and even vegetables were somewhat deficient.

In the text also there is a good deal of matter that will interest the statistician. The author is generally well informed, but sometimes he falls into considerable error. On p. 467, he speaks of the import of English cottons into India as having declined, as the result of the development of India's own cotton manufactures. This is very far indeed from being the case. Probably the mistake has arisen through taking some relative diminution, say a diminution in the proportion which the value of the import of English cottons into India bears to the total value of the imports, or a diminution in the relative importance of India as a market for English cottons, as equivalent to an absolute decline. In a note on p. 423, he seems to have been misled by the authority which he quotes. The note says: "it is reported that 'nearly' nine-tenths of the freight of the Magdeburg district of central Germany is carried by the Elbe. U.S. Con. Rep., No. 8, 1907." This is quite incredible. According to the *Stat. Jahrbuch für das Deutsche Reich*, 1913, the total amount of inland water traffic in 1911 was 81·5 millions of metric tons, against 427 millions carried by rail, and certainly the Elbe did not contribute the lion's share of the water traffic. Indeed, various passages seem to show that the author has not studied the conditions that make inland water traffic economic, and that he exaggerates the importance of this means of transport. He remarks (p. 125) "the efficiency of Europe's water routes and the important part that they perform in her commerce is shown by the comparatively small railway mileage. Europe has 20,000 miles less railway than the United States, although the area is slightly larger, and the population is four times as great." The figures are no doubt correct, but the explanation is not that given. The density of American railways is a necessary result of the growth of a population with a one-sided industry dependent for its very existence on railways to carry vast quantities of surplus bulky products to distant markets. G.G.C.

15.—*Other New Publications.**

Cressy (*Edward*). An Outline of Industrial History with special reference to Problems of the present Day. xiv + 364 pp., 8vo. London: Macmillan and Co., 1915. Price 3*s.* 6*d.* net.

[This book is intended as a supplement to the smaller and as an introduction to the larger histories which trace the growth of this country's national industry and commerce. Covering so wide a field, it can be but a framework, and the author has endeavoured to keep this fact in view. The book is divided as follows:—Part I. Primitive Man and Ancient Civilisation; Part II. The Transition from Ancient to Modern Civilisation; Part III. The Modern Period: A. Scientific and Technical Progress since 1700; B. Facilities for Commercial Development; C. The Evolution of Industrial Management; D. Industry and Politics. There is an appendix, giving a list of books for further reading, and an index.]

Davies (*Joseph*) and *Hailey* (*C. P.*). South Wales Coal Annual for 1916. 8vo. Cardiff: The Business Statistics Co., 1916. Price 7*s.* 6*d.* net.

[The present issue of this useful book gives the latest statistics of prices and production of coal, coke, patent fuel, and pitwood in this and other countries. Freights and railway rates are also given, and there is a section of the book dealing with wages.]

Farrow (*Thomas*) and *Crotch* (*W. Walter*). How to Win the War. The Financial Solution. 98 pp., 8vo. London: T. Werner Laurie, 1916. Price 1*s.* net.

[A description of the authors' scheme for a national thrift campaign and the provision of greater facilities for saving by the people of this country.]

Finance Acts of 1915, The. An annotated reprint of the Income Tax provisions of the new Acts. By the Income Tax expert of the *Accountant*. viii + 109 pp., sm. 8vo. London: Gee and Co., 1916. Price 1*s.* 6*d.*

[The enormous financial effect of the Finance Act, 1915, and the Finance (No. 2) Act, 1915, together with the introduction of ameliorative war provisions, makes those Acts of paramount current importance. The notes and explanations following the individual sections are mainly reprinted from the weekly Income Tax Notes of the *Accountant*. A list of relevant statutory references to other Acts is given to allow of easy correction of text-books.]

Goldscheid (*Rudolf*). Deutschlands Grösste Gefahr. Ein Mahnruf. 2e Auflage. 63 pp., sm. 8vo. Zurich: Art Institut Orell Füssli, 1916. Price 1 fr.

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* See also "Additions to the Library," page 251, *sqq.*

Grotius. Annuaire Internationale pour l'année 1915. 200 pp., 8vo. La Haye: Martinus Nijhoff, 1916. Price 3 florins 50 c.

[The third issue of this book, besides containing information on international law and arbitration, contains an article on "The Bank of the Netherlands and the War," by Dr. G. Vissering, its President.]

Guyot (*Yves*). Les causes et les conséquences de la Guerre. 416 pp., 8vo. Paris: Felix Alcan, 1915. Price 3 frs. 50 c.

[A careful study of the political and economic causes of the present war and an endeavour to determine under what conditions a permanent peace may be secured in future. The book is divided into five parts dealing respectively with: 1. The political causes of the war. 2. The economic causes of the war. 3. Historical causes and the constitution of the German Empire. 4. Historical causes and the Austro-Hungarian Monarchy. 5. Its consequences. Each of these divisions is divided into several chapters with headings which enables one to easily grasp the scope of the book. The author is of opinion that the political dissolution of the German Empire must of necessity follow as a result of the war.]

Hulftegger (*Dr. O.*). Die Bank von England, mit besonderer Berücksichtigung der Reservefrage und der Entwertung der englischen Rente. xiii + 423 pp., 8vo. Zurich: Art Institut Orell Füssli, 1915. Price 10 francs.

[Dr. Hulftegger divides his book into the following chapters, which are subdivided again into various sections:—1. Einleitung; 2. Das "Issue Department"; 3. Das "Banking Department"; 4. Die Reserve der Bank of England; 5. Die Stellung der Reserve im nationalen und internationalen Kreditsystem; 6. Der nationale Kredit; 7. Anhang. There is also a bibliography and index.]

Hurd (*Percy* and *Archibald*). The New Empire Partnership. Defence—Commerce—Policy. xvii + 322 pp., 8vo. London: John Murray, 1915. Price 6*s.* net.

[The authors' endeavour has been to inquire how far the present war has carried the new partnership of Empire in matters of defence and commerce and to indicate the lines of policy to be followed from the experience thus gained. The book is divided into the following sections:—Section I. Problems of Defence; Section II. Commerce; Section III. Policy. There are several diagrams and tables and an index.]

Hyde (*H. E.*). The Two Roads. International Government or Militarism. Will England Lead the Way? 155 pp., 8vo. London: P. S. King and Son, Ltd., 1916. Price 1*s.* 3*d.* net.

[The author advocates the establishment of international government (*i.e.*, government of the nations by the nations), or the adoption of militarism as a safeguard against the militarism of other nations. His scheme was published in New Zealand soon after the outbreak of war, but it was not then considered ripe for submission to the British public.]

Jevons (*H. Stanley*). The British Coal Trade xii + 876 pp., 8vo. London: Kegan Paul Trench and Co., 1915. Price 6*s.* net.

[Whether in war or peace, the coal trade is the most important British industry, and the economic problems involved in it demand careful handling and full knowledge. Professor Jevons deals with the coalfields of Great Britain and Ireland, with the methods of mining, the market and bye-products, mining law, including the Coal Mines (Minimum Wage) Act, miners' life, work and housing, foreign trade in coal, oil fuel, and the coal question. An important series of appendices (pp. 799–858) is indispensable to a complete survey of the subject. There are ten valuable illustrations, including a map of the coalfields The author was formerly Professor of Economics at the University College of South Wales and Monmouthshire, where experience has shown the urgency of coal trade problems.]

McFarlane (John). Economic Geography. 560 pp., 8vo. London: Sir Isaac Pitman and Sons, 1914. Price 7*s.* 6*d.* net.

[A novelty in a work of this kind has been the author's endeavour to divide the countries of the world into natural regions and to trace the influence of the geographical conditions of each upon the economic life of man within it. The book affords useful information to students of economic geography and sparse statistics are scattered throughout the volume. There are also some 18 maps and a bibliography.]

MacNutt (J. Scott). A manual for health officers. With a foreword by William T. Sedgwick. x + 650 pp., 8vo. New York: John Wiley and Sons, and London: Chapman and Hall, 1915. Price 12*s.* 6*d.* net.

[This book is intended specially for the use of health officers in the United States, but includes also information likely to be of value to persons engaged in unofficial institutions concerned with infant hygiene, tuberculosis and the like. It is divided into two parts, the first dealing with—Health authorities: their organisation and powers, and the second with Public Health Administration. The book consists of fifteen chapters, one dealing with vital statistics. There are also appendices and charts.]

Mender (Dr. Fritz). Das moderne Zollschutzsystem seine wissenschaftlichen Befürworter und Gegner in Deutschland seit den siebziger Jahren des XIX. Jahrhunderts. xviii + 232 pp., 8vo. Zurich: Art Institut Orell Füssli, 1916. Price 4 frs. 20 c.

[Dr. Mender's book is divided into the five following parts, each of which is subdivided into several chapters:—Abschnitte 1. Das moderne Zollschutzsystem die weltwirtschaftliche Entwicklung. 2. Das moderne Zollschutzsystem und das Bevolkerungsproblem. 3. Das moderne Zollschutzsystem und die Landwirtschaft. 4. Das moderne Zollschutzsystem und die Industrie. 5. Das moderne Zollschutzsystem und die Sozialpolitik.]

Mi-Baschan (Dr. A.). Der arabische Orient und der Krieg. vii + 40 pp., sm. 8vo. Zurich: Art Institut Orell Füssli, 1916. Price 1 franc.

[The book is divided into the four following chapters:—1. Die bisherigen Verhältnisse im Orient. 2. Kriegsvorbereitungen und Kriegsnot. 3. Militärische Operationen; Lage im Innern. 4. Die Zukunft des Morgenlandes.]

Mori (Dr. P.). Neue Wege schweizerischer Exportpolitik. Eine wirtschaftspolitische Studie. (Schweizer Zeit-Fragen. Heft 49.) 56 pp., 8vo. Zurich: Art Institut Orell Füssli, 1916. Price 2 frs.

[Dr. Mori divides his study into the three following parts:—Teil 1. Kritik der Exporttheorien. Teil 2. Wie kann die Leistungsfähigkeit der Industrie gehoben werden? Teil 3. Exportförderung.]

Sanders (Williams). The Practice and Law of Excess Profits Duty. 89 pp., sm. 8vo. London: Gee and Co., 1916. Price 1*s.* 6*d.* net.

[This little book has been issued in the hope that it may prove of assistance to accountants and others in the settling of liability to the duty.]

Smith (E. J.). Maternity and Child Welfare. A plea for the little ones. 88 pp., sm. 8vo. London: P. S. King and Son, 1915. Price 1*s.* net.

[Contains an account of the Bradford municipal maternity and child welfare scheme, and an indication of the economic and ethical reasons which make works of this nature of supreme importance to the State.]

Stoll (*Oswald*). The People's Credit. xii + 243 pp., 8vo. London: Eveleigh Nash, 1916. Price 5*s*. net.

[Advocates the extension of a credit system based on all property owned in the country. The chapters are as follows:—I. War and Finance. II. Exchange. III. The Medium of Exchange. IV. Credit. V. Credit Appropriation. VI. The Real Basis of Credit. VII. The People's Credit. VIII. Would the Change Hurt the Banks? IX. Would the Change Affect Currency? X. Would the Change Affect Prices? XI. Would the Change Affect our Daily Life? XII. Would the Change Affect the Empire? Conclusion. List of References.]

Stuckey (*Joseph J.*), M.A. Table of compound interest at $\frac{1}{8}$ per cent., and of Antilogarithms to Base 1·00125 whereby any compound interest function may be calculated, and the Logarithm or Antilogarithm to 60 figures or less, of any number of 60 figures or less to any base of 60 figures or less may be found. 117 pp., sm. 4to. London: George Allen and Unwin, Ltd., 1915. Price 21*s*. net.

Zueblin (*Charles*). American Municipal Progress. New and revised edition. xiv + 522 pp., 8vo. New York: Macmillan and Co., 1916. Price 8*s*. 6*d*.

[A new and revised edition of the book issued under the same title in 1902. It is intended primarily to indicate to civic and social workers and public officials the vast scope of municipal activity to-day, and is a useful record of American municipal progress. The book is divided into twenty chapters, and has a full bibliography and index.]

Canada. Report of the Ontario Commission on Unemployment. 334 pp., 8vo. Toronto, 1916.

[The Commission was appointed to examine into the permanent causes of recurring unemployment in Ontario and to recommend measures to mitigate it. Their report, which is of an exhaustive nature, consists of an introduction and is divided up as follows:—Part i. Conclusion and Recommendations; Part ii. Data regarding Unemployment in Ontario; Part iii. Studies of Representative Women's Employments; Part iv. Evidence taken before the Commission; and the following appendices: A. Labour Exchanges in the United Kingdom; B. Calculation of Probability; C. The Regularisation of Industry by Employers; D. Local Government in Great Britain and Canada; E. Memoranda Supplied at the Request of the Commission; F. Immigration and Employment; G. Unemployment; H. Returns of the Number of Manufacturing Operatives Employed during three years in 651 Factories in Ontario; I. Statistical Returns relating to Vagrancy in Toronto, Hamilton, Ottawa and London.

Cuba. Anuario Estadistico de la Republica de Cuba. Ano 1. 1914. 191 pp., 8vo. Habana, 1915. Price $1.50.

[This is the first issue of a statistical year book for the Republic of Cuba, and its compilers regret that it is not as complete as they would wish, and hope to extend its scope in later issues. It is a most useful compilation in its present form, however, bringing together statistical data relating to the Republic which had to be sought for previously in numerous publications, and it will be welcomed by students and others interested in Cuban affairs.]

Denmark. Dansk Sofart. (Danish Shipping.) xxxiv + 227 pp., 4to. Copenhagen: Berlingske Tidende, 1915.

[This book has been compiled by the editors of the *Berlingske Tidende*, a Copenhagen newspaper, and is printed in Danish and English. It is a useful record of the history and development of the shipping industry of Denmark. The different sections of the book have been written by experts, and such statistical tables as are given are up to date.]

Japan. The Recent Economic Development of Japan. Compiled by the Bank of Japan. 413 pp., with diagrams, 8vo. Tokio, 1915.

[A concise summary of the information contained in various official publications and other sources, showing the economic development of the country during recent years. It is hoped that the book will be of use to those interested in the study of financial and economic questions.]

United States. Trust Companies of the United States, 1915. Statements of condition, June 30, 1915. Names of officers and directors, stock quotations, dividend rates, other statistics. 527 pp., 8vo. New York: U.S. Mortgage and Trust Co., 1915.

Cotton Year Book and Diary, 1916. *Textile Mercury* Annuals. Eleventh year of issue. 659 pp., sm. 8vo. Manchester: Marsden and Co., 1916. Price 2*s.* 6*d.* net.

[A useful book of reference for mill managers and students of the cotton trade, and the present issue is well up to date as regards data and improvements in the industry.]

Economic Proceedings of Royal Dublin Society. Vol. ii. No. 2. March, 1916. The Food Value of Great Britain's Food Supply. By *W. H. Thompson*, M.D., Sc.D. 167–220 pp., 8vo. Dublin, 1916. Price 2*s.*

[Though several estimates of the food supply of this country have been made, these have not dealt with the relative food value of the different articles of diet which go to make up the total food supply, and this the author has attempted to do in the above study. He divides his report as follows:—Introduction. Section 1. Supplies. Section 2. Food Stuffs and Energy Value. Section 3. Distribution of Foodstuffs per Man. Literature. Appendix. The estimates of the food supply are based on the Board of Trade returns of imports and exports, the returns of the Board of Agriculture and Fisheries and the final report of the Census of Production.]

Financial Times Rubber Handbook. Giving the latest official information concerning a selection of young producing companies. 72 pp., 8vo. London: The *Financial Times*, Ltd., 1916. Price 1*s.* net.

The Ironmonger Metal Market Year Book, 1916. 159 pp., sm. 8vo. London: *The Ironmonger* Office, 1916. Price 3*s.* 6*d.* net.

[Contains the most recent statistics of prices and production of metals in this and some other countries which are available. During 1915 the fluctuations in prices have been so abnormal that the present issue of the book is of exceptional interest, and its scope has been also much extended.]

Labour Year-book, The, 1916. 704 pp., 8vo. London: Co-operative Printing Society, 1915. Price 2*s.* 6*d.*

[This is the first official year-book that the labour movement has possessed, and the Committee responsible for its publication hope that its reception and future will be happier than those of former "Labour annuals" and "Socialist year-books" whose circulation was insufficient to justify their regular publication. The book deals with labour in its various aspects, industrial, political, co-operative and international. There are also a series of special signed articles, and the book will be of much value to those interested in social and industrial problems.]

CURRENT NOTES.

With reference to the note in the last issue of the JOURNAL in regard to the memorial service for the late Lord Welby, it should be stated that among the representatives of the Society present was also Sir Jervoise A. Baines, C.S.I.

While the trade returns of the first three months of 1916 show very large values for imports, the figure for March being nearly ten million pounds greater than that for any previous month, the value of exports has shown a notable recovery. From the tables which we give below it will be seen that, in the twelve months ending March, 1916, though the value of exports of all kinds has been over 44 millions sterling greater than in the corresponding period a year earlier, the excess of imports over exports has increased by 122 millions, to which the value of the unrecorded imports for Government use has to be added. The rise in prices has been an important factor in the larger values for the later period, a point which helps in some degree to explain the contrast of increased values of imports and exports and decreased tonnage entered and cleared with cargoes. The comparison in our tables is with a period which covered the opening months of the war, though the last four months of peace were also included. The values of the principal classes of merchandise imported and exported in the twelve months ending March, 1916 and 1915, respectively, were as follows:—

	Twelve months ending March, 1916.	Twelve months ending March, 1915.	Increase (+) or Decrease (–).
Imports, value c.i.f.—	£'000.	£'000.	£'000.
I. Food, drink and tobacco	390,823,	318,689,	+ 72,134,
II. Raw materials and articles mainly unmanufactured	291,123,	236,396,	+ 54,727,
III. Articles wholly or mainly manufactured	188,861,	149,956,	+ 38,905,
IV. Miscellaneous and unclassified (including parcel post)	3,405,	2,435,	+ 970,
Total merchandise........	874,212,	707,476,	+ 166,736,
Imports of bullion and specie	23,574,	61,554,	– 37,980,

	Twelve months ending March, 1916.	Twelve months ending March, 1915.	Increase (+) or Decrease (−).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£'000.	£'000.	£'000.
I. Food, drink and tobacco	25,951,	25,722,	+ 229,
II. Raw materials and articles mainly unmanufactured	55,142,	50,533,	+ 4,609,
III. Articles wholly or mainly manufactured	313,095,	296,915,	+ 16,180,
IV. Miscellaneous and unclassified (including parcel post)	16,550,	8,565,	+ 7,985,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	21,966,	19,252,	+ 2,714,
II. Raw materials and articles mainly unmanufactured	58,357,	46,813,	+ 11,544,
III. Articles wholly or mainly manufactured	22,818,	21,753,	+ 1,065,
IV. Miscellaneous and unclassified	55,	67,	− 12,
Total British, foreign and colonial	513,934,	469,620,	+ 44,314,
Exports of bullion and specie	55,860,	31,216,	+ 24,644,
Shipping—	Tons net. '000.	Tons net. '000.	Tons net. '000.
Total, British and foreign, *entered* with cargoes	32,783,	40,155,	− 7,372,
Total, British and foreign, *cleared* with cargoes	38,006,	49,871,	− 11,865,

The Board of Trade data respecting retail food prices in the United Kingdom, which showed an increase of 44 per cent. between July, 1914, and December 1, 1915, and about 45 per cent. to January 1, 1916, give a further rise to 47 per cent. at the beginning of February and 48 per cent. at the beginning of March.

Tables based on returns in the *Statistische Korrespondenz* give an increase of food prices in Berlin equal to 83·4 per cent. in December and 88·5 per cent. in January against 82·0 per cent. in November. As previously stated even these high percentages can no longer be said to indicate the full extent to which the normal food supplies of Berlin have been reduced owing to the war. Some of the prices quoted are "maximum" prices, and certain articles for which prices are quoted appear to be practically unobtainable. In Vienna prices showed a fall of some 3·3 per cent. in December—the first fall since September, 1914—making the total increase since the beginning of the war 112·9 per cent. Maximum prices for bacon and hog's fat were in operation in December for the first time.

Wholesale prices continue to advance. The following are the *Statist* and *Economist* index-numbers:—

	Statist index-number.	*Economist* index-number.
December	118·4	165·1
January	123·6	174·5
February	127·6	182·2

Both numbers show a rise of a little over 57 per cent. from the beginning of the war. Of the several groups of commodities given in the *Statist*, animal foods and minerals show the greatest increases since December. Textiles and sundries have risen relatively little.

The *Gazette* price of British wheat which was 53*s*. 6*d*. in December rose to 56*s*. 5*d*. in January and 57*s*. 9*d*. in February.

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The percentage of trade union members unemployed which was 0·6 at the end of December, remained at the same figure in January, and fell further to 0·5 at the end of February. In the insured trades, owing mainly to the improvement in the building trades, the percentage of unemployed fell from 1·1 at the end of December to 1·0 per cent. in January and 0·8 per cent. in February. The employers' returns of wages paid in the principal textile industries show the following movements:—

Percentage changes in wages paid in the last week of each month, as compared with the corresponding week of the preceding month.

Month.	Cotton.	Woollen.	Worsted.
January	+4·0	+1·6	+1·1
February	−0·3	+3·0	+1·3

As compared with a year ago the numbers employed show only small changes, one way or the other, but wages paid are higher, in these trades, by some 10 to 15 per cent.

In Germany the trade union returns showed 2·6 per cent. unemployed at the end of December and of January against 2·5 per cent. at the end of November. Employment in the textile trades showed a further decline.

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The *Labour Gazette* for February summarises the fourth of a series of quarterly enquiries by the French Ministry of Labour into the effects of the war upon the industry and commerce of France. The number of employees mobilised, it is estimated, may be fixed at 24 per cent. of the total number of people (irrespective of age or sex) employed in normal times. The progressive reduction in the percentage of unemployed persons is then found to be as shown by the following table.

	August, 1914.	October, 1914.	January, 1915.	April, 1915.	July, 1915.	October, 1915.
Mobilised	24	24	24	24	24	24
Employed	34	44	57	63	69	74
Unemployed... ...	42	32	19	13	7	2
Total	100	100	100	100	100	100

Analysis by trade-groups shows a very great range in unemployment, from 44 per cent. (October, 1915) in the precious metal trades to 24 per cent. "over employment" so to speak in the other metal trades—*i.e.* the deficiency caused by mobilisation, in this case 32 per cent., has been largely met.

The Statistical Office of the City of Christiania has published the analysed results of an inquiry into the cost of living in the principal towns of Norway based on budgets of household expenditure during the year September 1, 1912, to August 31, 1913. The co-operation of the municipal authorities in the different towns has secured a representation from Bergen, Trondhjem, Drammen, Christiansand and Hamar, as well as from Christiania. After elimination of records which could not be utilised, 174 budgets were available, of which 105 related to the capital city and the remainder to the smaller towns. The presentation of the results has been carried out with great thoroughness, and interesting comparisons are made with the results of like inquiries in other countries. The material relates principally to working class households, but it also includes a considerable representation of minor officials and a few cases of families belonging to the middle class. The expenditures on different objects of consumption are not only stated in money, but the quantities consumed are specified, and, in the case of bread, the varying cost of a given quantity of bread in households with different scales of expenditure is shown. Some comparisons with results, on a narrower basis, relating to the year 1906–7, furnish an illustration of the modifications which rising prices induce in the nature of the consumption of households whose means do not expand in proportion to the rise in prices.

The Census and Statistics Office of Canada has issued a special report on the Foreign-Born Population of the Dominion as reported at the Census of 1911 which possesses a particular interest at a time when the war has directed unusual attention to the question of the origin of the non-British elements among the residents in British territories. The report shows that rather over 750,000 of the 7,200,000 persons enumerated in Canada in 1911 were foreign-born and that about 520,000 of these had arrived in the decennium preceding the Census. The high proportion of newly-arrived is, perhaps, even more striking as expressed in the fact that over 200,000 had arrived between the beginning of 1909 and the middle of 1911. As, moreover, over two-thirds of the foreign-born were resident west of the Great Lakes, the aggregate population among which they were distributed was about 1,750,000, so that they formed nearly 30 per cent. of the inhabitants of those provinces. The number of those born in Austria-Hungary was about 120,000, and of those born in Germany about 40,000, while Russia supplied 100,000 and France and Belgium together 25,000. What proportions of the 300,000 recorded as born in the United States were of German or Austro-Hungarian descent the report does not show. Of the total of foreign-born, less than half were naturalised, but this low proportion is due to the large number of recent arrivals, as only about 30 per cent. of those whose residence had lasted for over six years remained alien in their formal political allegiance. This proportion is, however, to be considered in relation to the fact that five-eighths of the foreign-born are males. In Alberta and Saskatchewan about a quarter of the men whose age and citizenship qualify them for a vote are foreign-born and a large addition to this may be expected as the more recent arrivals qualify for citizenship.

The separate publication of those sections of the constantly growing volume of London Statistics issued by the London County Council, which contain the data furnished by the Census Reports, will be welcomed by those who are more interested in demographic statistics than in the other matter relating to London which finds a place in the larger volume. The maps, descriptive introduction, tables and diagrams are well worth reproduction in this handy form, and a study of them furnishes much food for thought in the contrasts presented by the different sections of our great city.

The International Agricultural Institute published in 1913 a monograph on the production and consumption of chemical manures in the world, including also guano, natural deposits of potash salts, &c., and in fact, any form of manure which entered into international trade. Official statistics of production and trade were utilised as far as possible. Since then, later information has been published half-yearly by the Institute, in one or other of its Bulletins, and the latest return (for the second half of 1915) has been issued as a separate publication, under the title of "The "International Movement of Fertilisers and Chemical Products "useful to Agriculture." This gives data, both of production and consumption, of the chief manures for 1915, with comparisons for the two preceding years, but the particulars for 1915 are naturally very incomplete. Records of prices in different countries for the half-year are also included, and there is a bibliography.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

United Kingdom—

Accountants' Magazine. March, 1916—The War and Life Assurance.

Bankers' Magazine—

February, 1916—Progress of banking in Great Britain and Ireland during 1915. The Great Crisis: xix. The Probable Effects of the War on London's Position as a free Gold Centre: *Burrell (Hubert V.)*. A year of the New American Federal Reserve System: *Noyes (Alexander D.)*. The Problem of Prices. London Banker's Clearings in 1915. The Nation's Need.

March, 1916—The Great Crisis: xx. Financing the War. The Need of Scientific and Industrial Education. Bankers on the Situation. South African Finance and Banking, 1915. An Index Number for Stock Exchange Securities.

Economic Journal. March, 1916—Ways and means: *Foxwell (Prof. H. S.)*. Should we Capture German Trade?: *Bell (Sir Hugh)*. The Dilution of Skilled Labour. The Provisioning of France and Measures to that end: *Gide (Prof. Ch.)*. German War Finance in 1914: *Loveday (A.)*. German Potato Policy: *Stocks (Mary)*. The Present Situation of the Foreign Exchanges: *Cassel (Prof. G.)*.

Financial Review of Reviews. March, 1916—The Protection and Organisation of Industry: *Rolleston (Sir John)*. The Organisation of the Material Resources: *Wright (Arnold)*. How to Measure the Value of an Investment: *Stiles (C. R.)*. Investment Security in War-Time Conditions: *The Editor.*

Journal of the Institute of Bankers—

February, 1916—Some effects of War before and after Peace: *Chapman (Prof. S. J.)*. Gold movements and the Settlement of Trade Balances: *Sykes (Ernest)*. Foreign Banking Facilities: *Shortis (F. R. A.)*. The Work of the London Bankers' Clearing House during the year 1915.

March, 1916—"Adventurous" Banking: *Sykes (Ernest)*. The Foreign Banks in London: *Rogers (W. V.)*. A Numerical System for English Banks: *Lewis (Ernest M. E.)*. The Transfer of Stocks and Shares: *Rainey (J. H.)*.

Quarterly Journal of the Royal Meteorological Society. January, 1916—On the Seasonal Variability of Rainfall over the British Isles: *Comissopulos (N. A.)*.

UNITED KINGDOM—*Contd.*

Journal of the Board of Agriculture—

January, 1916—The Way in which Women can assist Agriculture and the increased Production of Food during the War: *Forbes* (*Miss E. M.*). The Improvement of Allotments. The Croydon Vacant Lands Cultivation Society: *Hudson* (*Miss E. L.*). Milk Production in War Time. Imports of Agricultural Produce in 1915. Notes on Crop Prospects and Live Stock Abroad.

February, 1916—Linseed as a Farm Crop. Willow-growing and Basket-making as Rural Industries: *Hutchinson* (*H. P.*). Some Methods of Adding to our Food Supplies: *Stapledon* (*R. G.*). Land Settlement for Sailors and Soldiers.

March, 1916—The Growing of Sugar Beet. Farm Valuations for Book-keeping Purposes: *Wyllie* (*James*). The Encouragement and Improvement of Light Horse Breeding in 1914-15. The Work of the Commercial Control Branch for the year 1915. How to Increase the Production of Food during the War.

Journal of the Royal Anthropological Institute. July to December, 1915—The Organisation and Laws of some Bantu Tribes in East Africa: *Dundas* (*Hon. Charles*).

Journal of Statistical and Social Inquiry Society of Ireland. December, 1915—President's Address: The Effect of the War on Irish Agriculture: *Stanuell* (*Charles A.*). Immunity against Infections Disease, with special reference to Anti-Typhoid Inoculation: *McWeeney* (*E. J.*). Housing: *Doyle* (*Daniel S.*). The Economic Interests involved in the Present War: *Oldham* (*Prof. C. H.*).

Public Health. March, 1916.—Certain Considerations regarding the Epidemiology of Phthisis Pulmonalis: *Brownlee* (*Dr. John*). The Importance of Notification in the Control of Measles: *Boyd* (*J. J.*).

Surveyors' Institution. Transactions. Part VI. *March*, 1916—On the Management of Estates in Mining Districts, and Mineral Valuations: *Brown* (*G. Turville*).

UNITED STATES—

American Journal of Sociology. January, 1916—A Business Man's Reflections on Labour Problems: *Arbitrator*. The Generalisations of Economic History: *Usher* (*A. P.*). The Social Survey: *Burgess* (*E. W.*). The Interpretation of Sociological Data: *Spiller* (*G*).

Annals of American Academy of Political and Social Science. January, 1916—Contains a series of Articles by different authors on National Industries and the Federal Government grouped under the following heads:—Part I. The Federal Trade Commission and its Problems. Part II. The Federal Reserve Board and its Accomplishments. Part III. The Interstate Commerce Commission and its Work. Part IV. Other Federal Departments in their relation to American Industries.

UNITED STATES—*Contd.*

Bankers' Magazine (*New York*)—

January, 1916—National Thrift Day to be observed. Chinese and American Exchange: *Denby* (*Hon. Charles*). Detroit. Its Progress in Industry, Commerce, and Banking.

February, 1916—Cost of the War to Europe. Review of Banking and Financial Conditions: *Forgan* (*F. H.*).

Casualty, Actuarial and Statistical Society of America. Proceedings. Vol. II., No. 4. October 22–23, 1915—The Classification of Industries for Workmen's Compensation Insurance: *Downey* (*E. H.*). Accident and Health Insurance from an Actuarial Viewpoint: *King* (*Walter I.*). Note on the Application of recent Mathematical-Statistical Methods to Coal Mine Accidents, with special Reference to Catastrophes in Coal Mines in the United States: *Fisher* (*Arne*). Burglary Insurance Statistics: *Garrison* (*Fred S.*). A System of Analysing Workmen's Compensation Business by means of Perforated Cards: *Cammack* (*E. E.*). Tables for Computing the Present Value of Death Benefits Arising under the New York Workmen's Compensation Law: *Fondiller* (*Richard*). A New Graphic Method of Using the Normal Probability Curve: *Speed* (*Buckner*).

Journal of Political Economy—

January, 1916—Probable Financial and Industrial Effects after the War: *Burton* (*Theodore E.*). Some Larger Aspects of the Trade in War Materials: *Mathews* (*Shailer*). Dislocations in the Foreign Trade of the United States resulting from the European War: *Sorrell* (*Lewis C.*).

February, 1916—War Finance and American Business: *Davenport* (*H. J.*). American Security Prices and Interest Rates: *Mitchell* (*Wesley C.*). The Nature of Demand for Agricultural Products and some Important Consequences: *Thompson* (*John G.*).

Political Science Quarterly. December, 1915—The Virginia Debt Controversy: *Randall* (*J. G.*). Competition and Capital: *Knauth* (*O. W.*). The New Banking System: *Willis* (*H. P.*). The Wrecking System of the Bahamas: *Wright* (*J. M.*). Foundations of West India Policy: *Fox* (*Dixon R.*). Record of Political Events: *Sait* (*E. M.*).

Quarterly Journal of Economics. February, 1916—Cost and Value of Service in Railroad Rate-making: *Lorenz* (*M. O.*). Joint Costs with especial regard to Railways: *Haney* (*Lewis H.*). Currency Depreciation in Time of War: *Whitaker* (*A. C.*). Neglected Factors in the Problem of Normal Interest: *Knight* (*F. H.*). Relation of Scientific Management to Labour: *Thompson* (*C. Bertrand*). The National Founders' Association: *Stecker* (*Margaret Loomis*). The Amalgamated Copper Company. A closed Chapter in Corporation Finance: *Richter* (*F. E.*).

CUBA—

La Reforma Social—

November, 1915—Numero dedicado a la cuestion monetaria en Cuba. Contrato del Gobierno con el Banco Nacional para la sustitucion de la moneda de oro espanola y francesa por monedas de oro del cuño nacional. Estadistica de la moneda cubana recibida.

January, 1916—La filosofia cientifica y las universidades: *Ingenieros* (*Jose*). La eleccion presidencial en Cuba: *Suarez* (*V. Pardo*).

FRANCE—

Bulletin de la Statistique Générale de France. July, 1915—Statistiques municipales. Enquête sur les prix de vente au détail des denrées dans les villes. Industrie. Italie: Recensement des ateliers et des entreprises industrielles en 1911. Prix. Norvège: Prix des grains et des pommes de terre de 1836 à 1914. Les étrangers à Paris d'après le recensement de 1911: *Huber* (*Michel*).

Bulletin de Statistique et de Législation Comparée—

November, 1915—Les recettes des théâtres et spectacles de Paris. (1850–1914). Les revenus de l'État.

December, 1915—Les fabriques de sucre et leurs procédés de fabrication (1914–15). Statistique des fabriques, entrepôts, magasins de vente en gros, magasins de vente au détail, etc., soumis en 1914 aux exercices des agents des contributions indirectes. Les revenus de l'Etat. Allemagne: La Banque d'Empire en 1913.

January, 1916—Allemagne: Prix moyens des principaux articles de consommation dans les provinces prussiennes de septembre à décembre, 1913, et de septembre à décembre 1915. Angleterre: Le capital anglais à l'étranger. États-unis: Loi relative à la création de banques fédérales de réserve. Italie: Exposé financier de M. Paolo Carcano, Ministre du Trésor. Russie: Les résultats définitifs de l'exercice 1912. Suisse: Message du Conseil fédéral à l'Assemblée fédérale concernant le budget de 1916.

Journal des Economistes—

January, 1916—La Situation internationale: *Guyot* (*Yves*). Le Marché financier en 1915: *Raffalovich* (*A.*). Esquisse d'un programme d'économies budgétaires: *Schelle* (*G.*). Encore les effectifs allemands: *Gouvy* (*L.*). En Espagne: I. L'Industrie sucrière. II. Création d'une caisse d'épargne postale: *Meriel* (*P. de*). A Cuba: I. L'Industrie sucrière. II. La Solidarité sociale: *Bougeois* (*Henry*).

February, 1916—Les Neutres et le Commerce maritime: *Guyot* (*Yves*). L'Avenir économique du Trentin: *Lemonon* (*Ernest*). La Morale et l'Échange internationaux: *Lambert* (*Henri*). Les Bilans de la Reichsbank. La Liquidation à la Bourse 1914–15: *Tchernoff* (*I.*). Le Change italien et les Finances de guerre. Emission et Circulation de billets. L'Impôt sur le revenu. Guide du contribuable. L'Organisation des chemins de fer français: *Nouvion* (*Georges de*). La Caisse des retraites et l'Emprunt de M. Ribot: *Guéroult* (*Georges*).

FRANCE—*Contd.*

Journal de la Société de Statistique de Paris—

January, 1916—La statistique internationale des valeurs mobilières: *Neymarck* (*Alfred*).

February, 1916—Les valeurs mobilières et la guerre: *Neymarck* (*Alfred*). Variété: A propos de milliards: *Cadoux* (*Gaston*). Note sur la petite monnaie: *A. B.*

March, 1916—La question des chemins de fer d'Alsace-Lorraine en 1870-71: *Meuriot* (*Paul*). Chronique des questions ouvrières et des assurances sur la vie: *Bellom* (*Maurice*).

Revue d'Économie Politique—

September-December, 1915—L'emprunt de guerre. La diminution de la population adulte male en Europe et ses conséquences économiques et sociales: *Girault* (*Arthur*). Un rapport official allemand sur les caisses de prêts de guerre: *Rist* (*Charles*). La crise économique en Suisse durant la guerre et l'action des sociétés co-opératives. Chronique: La situation économique de l'Allemagne après un an de guerre.

January-February, 1916—La guerre et l'organisation nationale de l'alimentation: *Gide* (*Charles*). La paix sociale après la guerre: *Villey* (*Edmond*). La campagne balkanique et le ravitaillement allemand. Les voies ferrées de montagnes. Le Simplon et le tunnel du Mont d'Or: *Bellet* (*Daniel*). Le développement de la co-opération russe: *Totomianz* (*Prof.*).

Revue des Sciences Politiques. February, 1916—La valeur scientifique et pratique de l'Economie politique: *Colson* (*Cl.*). La guerre sur mer: *Cloarec* (*Paul*). La taxation des vivres en Allemagne d'après un auteur anglais: *d'Eichthal* (*E.*).

ITALY—

Giornale degli Economisti e Rivista di Statistica.

January, 1916—Perchè e come il concetto dell' utilità economica è obbiettivamente indefinible: *Murray* (*Roberto A.*). Il concetto di "transvariazione" e le sue prime applicazioni: *Gini* (*Corrado*). La politica commerciale italiana e i suoi effetti sull' economia nazionale: *Fraschetti* (*Armando*).

February, 1916—Il Commercio marittimo dopo la guerra: *Corbino* (*Epicarmo*). Sulla misura del vantaggio che il consumatore ritrae da uno scambio: *Gobbi* (*Ulisse*). Sul concetto di utilita economica: *Gini* (*Corrado*). Alcune notizie sul risultato dei due prestiti nazionali del 1915 nelle varie provincie italiane: *Borgialli* (*Anselmo*). La politica commerciale italiana e i suoi effetti sull' economia nazionale: *Fraschetti* (*Armando*).

La Riforma Sociale—

January, 1916—Stelloncini critici: *Loria* (*Achille*). La teoria economica della dominazione della materia per mezzo dello spirito umano vincolato: *Porri* (*Vincenzo*).

ITALY—*Contd.*

La Riforma Sociale—Contd.

February–March, 1916—I primi rilievi dei provvedimenti repressivi dell' alcoolismo: *Prato* (*Giuseppe*). L' economia agricola e il prestito di guerra: *Agnelli* (*Arnaldo*). Costo e valore di mercato delle terre di bonifica del Basso Ferrarese: *Peglion* (*Vittorio*). Finanze di guerra e riforma tributaria: *Griziotti* (*Benvenuto*). Di alcune difficolta che presenta la imposizione del reddito nell' intrapresa agraria: *Fasolis* (*Giovanni*). I prezzi delle merci in Italia nel 1914: *Garino-Canina* (*Attilio*).

LIST OF ADDITIONS TO THE LIBRARY.

During the period that has elapsed since January 10, 1916, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Cuba—

Anuario Estadistico de la Republica de Cuba. Ano 1. 1914. 191 pp., 8vo. Habana, 1915. (The Cuban Government.)

Denmark—

Shipping. Dansk Søfart. (Danish Shipping.) xxxiv + 227 pp., 4to. Copenhagen, 1915. (Berlingske Tidende.)

Copenhagen. Københavnske Aktieselskabers Indtaegtsforhold. I Skatteaarene 1910–11 til 1914–15. 31 pp., 8vo. 1916. (The Municipal Statistical Bureau.)

Greece—

Prices. Bulletin Statistique des Prix Moyens des principaux Alimentaires, &c., 1913, 1914 and first quarter 1915. 4to. Athens, 1915. (Ministère de l'Economie Nationale.)

Japan—

Bank of Japan. The Recent Economic Development of Japan. 413 pp., with diagrams, 8vo. Tokio, 1915. (The Japanese Financial Commissioner.)

Netherlands—

Army. Supplément à la statistique médicale de l'armée indo-néerlandaise pendant 1912 et 1913 comme contribution à la statistique médicale militaire internationale. 8 pp., 4to. 1916. (The Statistical Bureau.)

Grotius. Annuaire Internationale pour 1915. 200 pp., 8vo. 1916. (Martinus Nijhoff.)

Norway—

Alcohol. Norges Officielle Statistik. VI. 63. Statistique des boissons alcooliques; III. Arrestations par suite d'ivresse en Norvège. 1896-1912. 23 pp., 8vo. 1916. (Department for sociale saker handel, industri og fiskeri.)

Christiania. Enquête statistique sur les recettes et dépenses de ménage dans quelques villes norvégiennes pendant l'année 1912–13. Publié par le Bureau municipal de Statistique de Kristiania. 179 pp., 8vo. Kristiania, 1916. (The Municipal Statistical Bureau.)

Paraguay—

Anuario Estadistico de la Republica del Paraguay. 1914. Fol. Asuncion, 1915. (Director-General of Statistics.)

Sweden—

Elections. Stadsfullmaktigvalen aren 1913 och 1914. Kungl. statistiska Centralbyran. 49 pp., 8vo. 1916. (The Central Statistical Bureau.)

Switzerland—

Bern (Canton). Mitteilungen des Kantonalen statistischen Bureaus. Jahrgang 1915.—Lieferung 11. Erlauterung des Inhalts der graphischen Darstellungen des bernisch-kantonalen Statistischen Bureaus an der Schweizer Landesausstellung 1914 in Bern. 137 pp., 8vo. 1916. (The Statistical Bureau.)

(a) Foreign Countries—*Contd.*

United States—

Children's Bureau. Child-Welfare Exhibits Types and Preparation. Miscellaneous Series No. 4. 58 pp., 8vo. 1915. (The Bureau.)

Labour. Bulletins of Bureau of Labour Statistics. Whole Numbers:—

167. Minimum-Wage Legislation in the United States and Foreign Countries. 335 pp., 8vo. 1915.

168. Wages and Hours of Labour in the Iron and Steel Industry. 1907 to 1913. 328 pp., 8vo. 1915.

169. Decisions of Courts Affecting Labour, 1914. 346 pp., 8vo. 1915.

171. Union Scale of Wages and Hours of Labour, May 1, 1914. 336 pp., 8vo. 1915.

173. Index-numbers of Wholesale Prices in the United States and Foreign Countries. 329 pp., 8vo. 1915.

174. Subject Index of the Publications of the United States Bureau of Labour Statistics up to May 1, 1915. 233 pp., 8vo. 1915.

177. Wages and Hours of Labour in the Hosiery and Underwear Industry, 1907 to 1914. 153 pp., 8vo. 1915.

178. Wages and Hours of Labour in the Boot and Shoe Industry, 1907 to 1914. 89 pp., 8vo. 1915.

179. Industrial Poisons used in the Rubber Industry. 64 pp., 8vo. 1915.

Illinois. University of Illinois Bulletin, No. 10. History of Illinois Central Railroad to 1870. By *Howard G. Brownson.* 182 pp., 8vo. Urbana, 1916. (The University.)

Minnesota. University. Studies in the Social Sciences. No. 5. Swamp Land Drainage, with special reference to Minnesota. By *Ben Palmer.* 138 pp., 8vo. Minneapolis, 1915. (The University.)

Trust Companies of the United States 1915. Statements of Condition, June 30, 1915. Names of Officers and Directors, Stock quotations, dividend rates, other statistics. 527 pp., 8vo. New York, 1915. (Mortgage and Trust Co.)

(b) India and Colonies.

India—

Trade of Indian Ports in First Year of War. Return showing quantities of principal Agricultural Products imported into Calcutta, Bombay, Karachi and Madras ports by rail, river and sea, and exported from India by sea to foreign countries during the first year of war. (August, 1914—July, 1915.) 13 pp., fol. 1915. (The Director of Statistics.)

Canada—

Census of Canada, 1911. Volume iv. Agriculture. 428 pp., 8vo. 1914. (The Census Office.)

—— Vol. v. Forest, Fishery, Fur and Mineral Production. 171 pp., 8vo. 1915. (*Id.*)

Ontario. Report of the Ontario Commission on Unemployment. Part 1. 86 pp., 8vo. Toronto, 1916. (The Legislative Assembly.)

(c) United Kingdom and its several Divisions.

United Kingdom—

Dominions Royal Commission. Memorandum and Tables as to the Trade Statistics and Trade of the Self-Governing Dominions prepared by the Commission. [Cd–8156.] 1916. (The Commission.)

Horses. Report of Committee on Supply of Horses for Military Purposes (England and Wales). Fol. 1915. [Cd–8134.] (Purchased.)

Publications. Report from Select Committee on Publications and Debates' Reports, with proceeding of Committee, Minutes of Evidence and appendices. (321.) 94 pp. 1915. (*Id.*)

(c) **United Kingdom and its several Divisions**—*Contd.*

United Kingdom—*Contd.*

Railways. Continental Railway Investigations. Report to Board of Trade on Railways in Austria and Hungary. [Cd-4878.] 1909. (Purchased.)

—— Continental Railway Investigations. Reports to Board of Trade on Railways in Belgium, France and Italy. [Cd-5106.] 1910. (*Id.*)

—— State Railways (British Possessions and Foreign Countries). (287.) 1913. (*Id.*)

Shops' Committee. Report of Committee on Conditions of Retail Trade which can best secure that the further enlistment of men or their employment in other National services may not interfere with the operations of that trade. [Cd-8113.] 1915. (*Id.*)

Venereal Diseases. Royal Commission on Venereal Diseases. Final Report of the Commissioners. [Cd-8189.] 1916. (*Id.*)

War Office. Catalogue of War Office Library. Part III. (Subject Index.) Fourth Annual Supplement. January to December, 1915. 104 pp., 8vo. 1916. (The War Office.)

Great Britain—

Board of Agriculture and Fisheries. Fishery Investigations. Series II.—Sea Fisheries. Vol. III.—No. 2. Report on Sexual Differentiation in the Biology and Distribution of Plaice in the North Sea. 73 pp., fol. 1916. (The Board.)

Report of Agricultural Education Conference. Agricultural Education for Women. (Board of Agriculture and Fisheries.) 84 pp., fol. 1915. (*Id.*)

England and Wales—

County of London. Census, 1911. Report by Clerk of Council upon Statistics relating to London contained in Various Volumes of Census of England and Wales, 1911. 95 pp., 8vo. 1915. (Purchased.)

Ireland—

Food. Departmental Committee on Food Production in Ireland. Minutes of Evidence, Minutes of Deliberate Conferences, and Appendices. [Cd-8158.] 1916. (Purchased.)

Scotland—

Rents. Report of Departmental Committee on Increases in Rental of Small Dwelling-Houses in Industrial Districts in Scotland. [Cd-8111.] 1915. (Purchased.)

—— Minutes of Evidence taken before the Committee. With Appendices and Index. [Cd-8154.] 1916. (*Id.*)

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Bulkley (*M. E.*). Studies in the Minimum wage. No. iii. Boxmaking Industry under the Trades Boards Act of 1909. (Ratan Tata Foundation publication.) 95 pp., sm. 8vo. London, 1915. (The Foundation.)

Cahn (*Herman*). Capital To-day. A study of recent economic development. 313 pp., 8vo. New York, 1915. (G. P. Putnam's Sons.)

Charlier (*C. V. L.*)—

Contributions to the mathematical theory of Statistics. 9. Convergence of developments in series of type A. 6 pp., 8vo. Uppsala, 1915. (Lunds Astronomiska Observatorium.)

Notes on Statistical Mechanics. 18 pp., 8vo. Stockholm, 1915. (*Id.*)

On the Mean Distances and Luminosities of Stars of Different Spectral Types. 17 pp., 8vo. Stockholm, 1915. (*Id.*)

Cressy (*Edward*). An Outline of Industrial History with special reference to Problems of the present Day. 364 pp., 8vo. London, 1915. (Macmillan and Co.)

(d) **Authors, &c.**—*Contd.*

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Fisher (*Arne*). Mathematical Theory of Probabilities, and its application to frequency curves and statistical Methods. 171 pp., 8vo. London, 1916. (Macmillan and Co.)

Goldscheid (*Rudolf*). Deutschlands Grösste Gefahr. Ein Mahnruf. 2^e Auflage. 63 pp., sm. 8vo. Zurich, 1916. (Art Institut Orell Füssli.)

Gray (*Howard Levi*). English Field Systems. Harvard Historical Studies. Volume xxii. 568 pp., 8vo. Cambridge, 1915. (Purchased.)

Hauser (*Henri*). Les Méthodes Allemandes d'Expansion Économique. 280 pp., sm. 8vo. Paris, 1915. (Librarie Armand Colin.)

Hurd (*Percy* and *Archibald*). The New Empire Partnership. Defence—Commerce—Policy. 322 pp., 8vo. London, 1915. (J. Murray.)

Hyde (*H. E.*). The Two Roads. International Government or Militarism. Will England Lead the Way? 155 pp., 8vo. London, 1916. (P. S. King and Son, Ltd.)

Kitchin (*Joseph*). Trade Cycles Chart. Chart. 1916.

Knott (*Cargill*). Napier Tercentenary Memorial Volume. (Royal Society of Edinburgh.) 441 pp., 4to. London, 1915. (Longmans and Sons.)

McFarlane (*John*). Economic Geography. 560 pp., 8vo. London, 1914. (Purchased.)

Masaryk (*Prof. T. G.*). The Problem of Small Nations in the European Crisis. Foreign Series No. 2. 32 pp., 8vo. London, 1915. (Bohemian National Alliances.)

Massé (*Alfred*). Le Troupeau Français et la Guerre. Viande Indigène. Viande Importée. 381 pp., sm. 8vo. Paris, 1916. (Librairie Agricole de la Maison Rustique.)

Mender (*Dr. Fritz*). Das moderne Zollschutzsystem seine wissenschaftlichen Befürworter und Gegner in Deutschland seit den siebziger Jahren des XIX. Jahrhunderts. 232 pp., 8vo. Zurich, 1916. (Art Institut Orell Füssli.)

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Mori (*Dr. P.*). Neue Wege schweizerischer Exportpolitik. Eine wirtschaftspolitische Studie. (Schweizer Zeit-Fragen. Heft 49.) 56 pp., 8vo. Zurich, 1916. (*Id.*)

Orensteen (*Myer M.*). Correlation of Anthropometrical Measurements in Cairo-Born Natives. (From *Biometrika*. Vol. XI. Nos. 1 and 2. November, 1915. 16 pp., 8vo. London, 1915. (The Author.)

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PERIODICAL RETURNS.

REGISTRATION OF THE UNITED KINGDOM.

No. I.—ENGLAND AND WALES.

MARRIAGES, BIRTHS AND DEATHS—To 31st December, 1915.

A.—*Serial Table of* Marriages, Births, *and* Deaths, *returned in the Years* 1915-1909, *and in the* Quarters *of those Years.*

Calendar Years, 1915-1909:—*Numbers.*

Years.........	1915.	'14.	'13.	'12.	'11.	'10.	'09.
Marriages No.	360,026	294,087	286,583	283,834	274,943	267,721	260,544
Births........ ,,	814,527	878,822	881,890	872,737	881,138	896,962	914,472
Deaths .... ,,	562,326	516,778	504,975	486,939	527,810	483,247	518,003

Quarters *of each Calendar Year,* 1915-1909.

(I.) Marriages:—*Numbers.*

Qrs. ended last day of	1915.	'14.	'13.	'12.	'11.	'10.	'09.
March........No.	55,406	51,016	60,926	44,737	44,808	56,432	45,094
June .... ,,	97,038	81,096	65,904	74,619	75,656	61,036	71,829
September ,,	102,567	82,024	83,636	83,505	77,873	76,545	73,843
December ,,	105,015	79,951	76,117	80,973	76,606	73,708	69,778

(II.) Births:—*Numbers.*

Qrs. ended last day of	1915.	'14.	'13.	'12.	'11.	'10.	'09.
March........No.	221,468	217,357	216,629	222,600	223,585	221,684	228,787
June .... ,,	213,104	226,067	227,470	218,070	225,774	234,825	237,220
September ,,	196,510	227,122	225,501	219,232	222,506	227,146	228,840
December ,,	183,445	208,276	212,290	212,835	209,273	213,307	219,625

(III.) Deaths:—*Numbers.*

Qrs. ended last day of	1915.	'14.	'13.	'12.	'11.	'10.	'09.
March........ No.	177,251	146,217	146,541	144,642	143,128	136,400	160,506
June .... ,,	138,583	124,134	121,743	115,777	119,966	115,671	125,233
September ,,	109,415	115,545	113,446	101,680	140,949	104,149	104,786
December ,,	137,077	130,882	123,245	124,840	123,767	127,027	127,478

Annual Rates of MARRIAGES, BIRTHS, *and* DEATHS, *per* 1,000 PERSONS LIVING *in the Years* 1915-1909, *and in the* QUARTERS *of those Years.*

Calendar YEARS, 1915-1909:—*General Ratios.*

YEARS	1915.	Mean 1905-'14.	1914.	'13.	'12.	'11.	'10.	'09.
Estmtd. Popln. of England and Wales *in thousands* in middle of each Year*	*	—	37,303,	36,919,	36,540,	36,164,	35,792,	35,424,
Persons Married	19·3	15·4	15·8	15·5	15·5	15·2	15·0	14·7
Births	21·8	25·4	23·6	23·9	23·8	24·4	25·1	25·8
Deaths	15·1	14·4	13·9	13·7	13·3	14·6	13·5	14·6

QUARTERS *of each Calendar Year,* 1915-1909.

(I.) PERSONS MARRIED:—*Ratio per* 1,000.

Qrs. ended last day of	1915.	Mean 1905-'14	1914.	'13.	'12.	'11.	'10.	'09.
March	12·0	11·2	11·1	13·4	9·8	10·0	12·8	10·3
June	20·9	16·2	17·4	14·3	16·4	16·8	13·7	16·3
September	21·8	17·3	17·4	18·0	18·1	17·1	17·0	16·5
December	22·3	16·7	17·0	16·4	17·6	16·8	16·3	15·6

(II.) BIRTHS:—*Ratio per* 1,000.

Qrs. ended last day of	1915.	Mean 1905-'14.	1914.	'13.	'12.	'11.	'10.	'09.
March	24·1	25·9	23·6	23·8	24·4	25·1	25·1	26·2
June	22·9	26·2	24·3	24·7	23·9	25·0	26·3	26·9
September	21·0	25·5	24·2	24·2	23·8	24·4	25·2	25·6
December	19·5	24·1	22·2	22·8	23·1	23·0	23·6	24·6

(III.) DEATHS:—*Ratio per* 1,000.

Qrs. ended last day of	1915.	Mean 1905-'14.	1914.	'13.	'12.	'11.	'10.	'09.
March	19·3	16·9	15·9	16·1	15·9	16·1	15·5	18·4
June	14·9	13·7	13·3	13·2	12·7	13·3	13·0	14·2
September	11·6	12·8	12·3	12·2	11·0	15·5	11·5	11·7
December	14·6	14·3	13·9	13·2	13·6	13·6	14·1	14·3

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* The estimated populations shown in this Return are based on the Censuses of 1901 and 1911. The old estimates for 1914 have been continued in use for 1915, no reliable estimates of total populations in 1915 being available. The revised estimate for England and Wales in the middle of 1914, based upon the returns of births, deaths, and migration, is 36,960,684.

B.—*Special Town Table:*—POPULATION; BIRTH-RATE *and* DEATH-RATE *in each Quarter of* 1915, *in certain of the* NINETY-SIX *Large Towns.*

Cities and boroughs.	Estimated population in the middle of the year 1914.	Annual Rate to 1,000 Living during the thirteen weeks ending							
		April 3, 1915. (1st quarter.)		July 3, 1915. (2nd quarter.)		Oct. 2, 1915. (3rd quarter.)		Jan. 1, 1916. (4th quarter.)	
		Births.	Deaths.	Births.	Deaths.	Births.	Deaths.	Births.	Deaths.
Ninety-six towns	18,136,180	25·3	19·6	24·2	15·1	21·7	12·3	20·5	15·5
Including—									
London	4,516,612	25·1	20·6	24·1	15·2	21·4	12·4	21·1	16·1
West Ham	296,570	31·3	19·0	29·0	14·5	26·4	12·9	27·3	17·4
Croydon	181,956	21·3	17·8	21·7	13·2	19·8	9·4	18·2	12·3
Brighton	133,936	17·8	23·9	18·8	14·5	15·4	11·2	15·5	15·1
Portsmouth	245,827	24·5	18·7	20·0	12·8	18·0	10·0	18·7	12·3
Plymouth	212,421	23·1	21·7	20·9	15·9	17·3	11·7	19·1	15·6
Bristol	363,312	21·9	21·0	21·6	13·5	18·8	11·3	18·9	15·1
Cardiff	188,495	27·4	17·8	21·4	13·3	24·6	12·1	22·4	15·2
Swansea...............	121,665	29·8	17·5	27·2	12·1	23·2	10·5	21·4	13·7
Wolverhampton	95,725	27·7	22·7	25·9	18·4	22·5	11·5	22·9	14·8
Birmingham	868,430	27·4	18·2	26·2	14·1	22·9	11·9	21·5	14·7
Norwich	124,107	22·8	19·6	22·1	14·1	17·5	11·4	18·0	13·2
Leicester	232,664	12·7	16·9	22·5	12·9	20·3	12·3	18·6	16·1
Nottingham	266,918	23·7	18·3	22·4	14·1	19·8	12·2	17·3	15·4
Derby	126,389	24·8	17·4	23·5	14·2	20·8	11·1	17·7	15·2
Birkenhead	137,710	30·4	18·4	29·8	14·1	27·5	14·2	24·8	15·1
Liverpool	767,992	30·8	21·2	30·3	17·8	26·1	15·6	25·7	19·9
Bolton	185,247	22·5	17·5	19·8	13·9	19·2	11·5	16·6	15·0
Manchester	738,538	25·4	19·5	24·3	17·0	22·2	12·8	19·9	16·5
Salford	234,975	25·7	20·3	24·9	18·6	21·3	13·3	19·7	16·7
Oldham................	151,044	22·9	21·7	20·8	15·9	17·7	12·8	16·8	15·9
Burnley...............	110,040	21·3	18·2	19·6	13·6	17·1	12·5	15·1	17·9
Blackburn............	134,387	20·7	19·3	20·0	14·3	17·8	10·9	14·4	16·4
Preston	118,514	24·0	23·9	23·4	15·8	19·9	13·3	17·9	17·0
Huddersfield	112,265	18·9	19·7	18·6	16·1	15·9	12·7	15·9	15·4
Halifax	100,373	17·9	20·2	16·5	17·2	18·0	14·6	14·1	14·9
Bradford	291,482	18·9	17·8	18·4	16·9	17·6	13·4	14·8	15·6
Leeds..................	459,260	24·2	20·7	22·9	15·3	20·6	13·8	19·1	16·1
Sheffield	477,228	27·9	18·5	26·1	19·0	24·9	14·8	23·0	15·5
Hull	291,118	27·1	18·1	25·8	14·3	24·3	14·1	22·3	15·0
Sunderland	152,927	32·4	23·0	32·8	21·2	27·4	15·1	24·8	18·0
Gateshead............	119,362	32·8	23·8	33·1	18·3	29·5	16·9	26·4	19·0
Newcastle-on-Tyne	273,415	29·5	23·4	28·9	16·3	27·8	14·0	24·7	16·3

Note.—The 96 great towns are those with populations exceeding 50,000 persons at the Census of 1911. The birth-rate is based upon births actually registered in the several towns. The death-rate in London has been corrected as far as possible (1) by excluding deaths of all non-residents, and (2) by including the deaths of London residents occurring in the Metropolitan outer ring or in Metropolitan public institutions situated outside the County. The death-rates in the other towns have been corrected, as far as possible (1) by the exclusion of all deaths of non-residents, and (2) by the inclusion of deaths of residents in certain outlying public institutions. With regard to the outer ring and its constituent areas, however, correction is more complete, a distribution of all transferable deaths occurring in any part of Greater London having been made. The old estimates of population in the middle of 1914 have been used in the calculation of these rates.

C.—*Comparative Table of* CONSOLS, PROVISIONS, COAL, *and* PAUPERISM *in each* QUARTER *of* 1913-14-15.

Cols...	1	2	3	4			5			6	7	8
	Average prices of										PAUPERISM.	
Quarter ended	2½*l.* per cent. CONSOLS (for money) per 100*l.* Stock.*	Average minimum rate per cent. of DISCOUNT charged by the Bank of England.*	WHEAT per quarter.†	Price per pound at the Metropolitan Cattle Market (sinking the offal).‡						Average price of seaborne COAL per ton in the London market.§	Average number of PAUPERS relieved on the *last day* of each week.	
				Beef.			Mutton.					
				Inferior quality.	Second quality.	First quality.	Inferior quality.	Second quality.	First quality.		In-door.	Out-door.
1913	£ *s.* *d.*	£	*s.* *d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*s.* *d.*		
Iar. 31	74 10 2	5·00	30 10	5⅛	6½	8	6⅜	8⅝	10⅜	21 0	274,467	388,295
une 30	74 5 6	4·59	32 3	5	7	8⅛	5⅞	7⅝	9¼	‖	255,001	371,667
ept. 30	73 6 11	4·50	32 10	4½	7	8	6	7¾	9⅛	21 0	244,358	364,441
ec. 31	72 9 2	4·99	30 8	4½	6⅞	8	6¾	8⅞	10⅛	21 0	255,791	366,780
1914												
Iar. 31	74 15 8	3·47	31 1	5⅜	6⅝	8	6½	9⅛	10⅞	21 0	265,791	377,982
une 30	74 18 0	3·00	32 9	5½	6¾	7⅞	6⅛	8½	10	21 0	252,721	372,559
ept. 30	74 16 2¶	4·66	36 3	4⅞	7¼	8¼	7	9⅛	10⅜	‖	249,484	383,627
ec. 31	¶	5·00	39 11	5⅛	7¼	8½	7⅛	8⅞	10⅜	‖	256,057	379,437
1915												
Iar. 31	68 5 5	5·00	52 5	5⅝	8⅜	9½	7¾	9⅜	11⅛	‖	255,818	379,469
une 30	66 8 4	5·00	58 1	7⅝	9½	10⅞	8¾	10½	11⅞	‖	234,944	366,057
ept. 30	65 0 11	5·00	49 8	7⅝	10⅛	11⅞	8¼	10⅛	11½	‖	221,902	352,005
ec. 31	62 3 9	5·00	51 5	6½	8⅝	10	7¾	9½	11⅛	‖	223,562	340,867

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* The price of Consols and the Rate of Discount are furnished by the Chief Cashier of the Bank of England.

† As published by the Board of Agriculture.

‡ Furnished by the Board of Agriculture.

§ Furnished by the Mining Statistics Branch of the Home Office. The prices relate to underland coal only.

‖ No quotations during the quarter.

¶ This amount relates to the month of July only, no official quotation having been obtainable or August and September owing to the closing of the Stock Exchange. The Stock Exchange emained closed during the quarter ended December 31, 1914, and no official prices were therefore ecorded, but the minimum price at which transactions in this security were allowed by the tock Exchange Committee was 68*l.* 10*s.*

No. II.—SCOTLAND.

BIRTHS, DEATHS, AND MARRIAGES, IN THE YEAR ENDED 31ST DECEMBER, 1915.

I.—*Serial Table:—Number of* BIRTHS, DEATHS, *and* MARRIAGES *in Scotland, and their Proportion to the Population estimated to the Middle of each Year, during each Quarter of the Years* **1915-1911** *inclusive.*

	1915.		1914.		1913.		1912.		1911.	
	Number.	Per 1,000.	Number.	Per 1,000.	Number.	Per 1,000.	Number.	Per 1,000.	Number.	Per 1,000.
1st Quarter—										
Births	31,008	26·3	30,656	26·3	29,825	25·6	30,272	25·6	30,710	26·1
Deaths........	24,981	21·2	20,654	17·7	21,270	18·2	20,671	17·5	19,794	16·9
Marriages ..	7,993	6·8	8,631	7·4	7,841	6·7	6,994	5·9	6,758	5·8
2nd Quarter—										
Births	30,809	25·8	33,009	28·0	32,198	27·3	32,221	27·3	32,935	27·7
Deaths........	20,414	17·1	18,169	15·4	18,143	15·4	17,728	15·0	18,029	15·2
Marriages ..	9,244	7·8	9,088	7·7	8,503	7·2	8,209	7·0	8,567	7·2
3rd Quarter—										
Births	26,797	22·2	30,336	25·5	29,487	24·7	30,166	25·3	29,653	24·7
Deaths........	15,929	13·2	16,219	13·6	16,194	13·6	15,219	12·8	16,149	13·4
Marriages ..	9,643	8·0	9,358	7·9	9,037	7·6	8,778	7·4	8,434	7·0
4th Quarter—										
Births	25,590	21·2	29,933	25·1	29,006	24·3	30,057	25·2	28,513	23·7
Deaths........	20,305	16·8	18,515	15·5	17,462	14·6	18,719	15·7	17,760	14·8
Marriages ..	9,385	7·8	7,972	6·7	8,310	7·0	8,529	7·1	8,052	6·7
Year—										
Population.	4,785,598		4,747,167		4,728,132		4,741,077		4,749,673	
Births	114,204	23·9	123,934	26·1	120,516	25·5	122,716	25·9	121,811	25·6
Deaths........	81,629	17·1	73,557	15·5	73,069	15·5	72,337	15·3	71,732	15·1
Marriages ..	36,265	7·6	35,049	7·4	33,691	7·1	32,510	6·9	31,811	6·7

II.—*Special Average Table:—Number of Births, Deaths, and Marriages in Scotland and in the divisions of the counties during each Quarter of* 1915, *and their proportion to the population.*

Registration group of districts.	Total Births.		Deaths.		Marriages.	
	Number.	Per 1,000 of population.	Number.	Per 1,000 of population	Number.	Per 1,000 of population.
1*st Quarter*—SCOTLAND	31,008	26·3	24,981*	21·2	7,993	6·8
Northern division	470	19·4	517	21·4	87	3·6
North Western div....	777	20·5	885	23·4	175	4·6
North Eastern div.	2,902	26·1	2,378	21·4	644	5·8
East Midland div.	4,258	24·5	4,192	24·2	1,079	6·2
West Midland div.	2,412	25·6	1,809	19·2	538	5·7
South Western div.....	15,170	29·2	10,739	20·7	3,971	7·6
South Eastern div.	4,098	23·6	3,359	19·3	1,253	7·2
Southern div.	921	20·9	1,017	23·1	246	5·6
2*nd Quarter*—SCOTLAND	30,809	25·8	20,414†	17·1	9,244	7·8
Northern division	467	19·1	502	20·5	108	4·4
North Western div.....	682	17·8	743	19·4	174	4·5
North Eastern div.	2,786	24·8	1,958	17·4	913	8·1
East Midland div.	4,114	23·4	2,875	16·4	1,180	6·7
West Midland div.	2,547	26·7	1,461	15·3	571	6·0
South Western div.....	15,156	28·8	9,232	17·6	4,363	8·3
South Eastern div.	4,080	23·2	2,734	15·6	1,597	9·1
Southern div.	977	21·9	790	17·7	338	7·6
3*rd Quarter*—SCOTLAND	26,797	22·2	15,929‡	13·2	9,643	8·0
Northern division	419	17·0	345	14·0	88	3·6
North Western div....	646	16·7	520	13·4	142	3·7
North Eastern div.	2,481	21·9	1,596	14·1	841	7·4
East Midland div.	3,590	20·2	2,295	12·9	1,254	7·1
West Midland div.	2,152	22·3	1,189	12·3	543	5·6
South Western div.....	13,082	24·6	7,094	13·3	4,888	9·2
South Eastern div.	3,511	19·8	2,169	12·2	1,664	9·4
Southern div.	916	20·3	588	13·0	223	4·9
4*th Quarter*—SCOTLAND	25,590	21·2	20,305§	16·8	9,385	7·8
Northern division........	403	16·3	407	16·4	137	5·5
North Western div. ..	587	15·2	641	16·6	224	5·8
North Eastern div.	2,327	20·5	1,712	15·1	1,013	8·9
East Midland div.	3,319	18·7	2,960	16·7	1,293	7·3
West Midland div.....	1,994	20·7	1,480	15·4	523	5·4
South Western div.....	12,874	24·2	9,419	17·7	4,310	8·1
South Eastern div.	3,265	18.4	2,811	15·8	1,569	8·8
Southern div.	821	18·2	744	16·5	316	7·0

* Including 85 unallocated deaths. † Including 119 unallocated deaths.
‡ Including 133 unallocated deaths. § Including 131 unallocated deaths.

Population of Scotland.

Population.	Scotland.	Northern division.	North Western division.	North Eastern division.	East Midland division.	West Midland division.	South Western division.	South Eastern division.	Southern division.
By Census of 1911	4,760,904	105,997	164,636	467,333	712,146	386,312	2,033,521	700,577	190,382
Estimated to middle of 1915	4,780,900	98,100	153,400	450,300	704,000	382,400	2,108,700	705,100	178,900

No. III.—IRELAND.

IRELAND.—*Number of Births, Deaths and Marriages in each Province for each Quarter of* 1915 *and their Proportion to the Population.*

Provinces.	Births. Number.	Births. Annual rate per 1,000 of population.	Deaths. Number.	Deaths. Annual rate per 1,000 of population.	Marriages.* Number.	Marriages.* Annual rate per 1,000 of population.
1st quarter—						
Leinster	6,899	23·7	7,337	25·3	1,705	5·9
Munster	5,880	22·7	5,141	19·9	977	3·8
Ulster	9,458	23·9	8,872	22·4	2,395	6·1
Connaught	3,536	23·1	2,820	18·5	531	3·5
Ireland	25,773	23·5	24,170	22·1	5,608	5·1
2nd quarter—						
Leinster	7,090	24·4	5,599	19·3	1,584	5·5
Munster	5,812	22·5	4,429	17·1	1,811	7·0
Ulster	9,452	23·9	7,220	18·3	2,055	5·2
Connaught	3,306	21·6	2,552	16·7	825	5·4
Ireland	25,660	23·4	19,800	18·1	6,275	5·7
3rd quarter—						
Leinster	6,227	21·4	4,162	14·3	1,786	6·1
Munster	5,356	20·7	3,379	13·1	1,229	4·7
Ulster	8,244	20·8	5,432	13·7	2,544	6·4
Connaught	2,952	19·3	1,697	11·1	620	4·1
Ireland	22,779	20·8	14,670	13·4	6,179	5·6
4th quarter—						
Leinster	5,734	19·7	5,278	18·2	1,962	6·8
Munster	4,985	19·3	3,756	14·5	1,193	4·6
Ulster	7,805	19·7	6,525	16·5	2,481	6·3
Connaught	2,959	19·4	1,970	12·9	470	3·1
Ireland	21,483	19·6	17,529	16·0	6,106	5·6
Total	95,695	21·8	76,169	17·4	24,168	5·5

* For the preceding quarter.

Population of Ireland.

	Leinster.	Munster.	Ulster.	Connaught.	Ireland.
By census of 1911	1,162,044	1,035,495	1,581,696	610,984	4,390,219
Estimated to middle of 1915	—	—	—	—	4,381,398

IRELAND.

	Births.		Deaths.		Marriages.*	
	Number.	Annual rate per 1,000 persons.	Number.	Annual rate per 1,000 persons.	Number.	Annual rate per 1,000 persons.
1st quarter, 1915—						
Total rural districts	15,854	21·4	15,092	20·4	—	
Total urban districts	9,919	27·9	9,078	25·5	—	
Dublin co. borough	2,540	—	2,616	—	610	
Belfast co. borough	2,928	—	2,293	—	885	
2nd quarter—						
Total rural districts	16,073	21·7	13,182	17·8	—	
Total urban districts	9,587	26·9	6,618	18·6	—	
Dublin co. borough	2,500	—	1,771	—	675	
Belfast co. borough	2,699	—	1,684	—	664	
3rd quarter—						
Total rural districts	14,305	19·3	9,363	12·6	—	
Total urban districts	8,474	23·8	5,307	14·9	—	
Dublin co. borough	2,307	—	1,466	—	725	
Belfast co. borough	2,391	—	1,362	—	977	
4th quarter—						
Total rural districts	13,785	18·6	10,988	14·8	—	
Total urban districts	7,698	21·6	6,541	18·3	—	
Dublin co. borough	1,988	—	1,876	—	860	
Belfast co. borough	2,247	—	1,825	—	968	

* For the preceding quarter.

No. IV.—GREAT BRITAIN AND IRELAND.

SUMMARY *of* MARRIAGES, *in the Year ended* 30*th September*, **1915**; *and of* BIRTHS *and* DEATHS, *in the Year ended* 31*st December*, **1915**.

(Compiled from the Quarterly Returns of the respective Registrars-General.)

Countries.	[000's omitted]		Marriages.	Per 1,000 of population.	Births.	Per 1,000 of population.	Deaths.	Per 1,000 of population.
	Area in statute acres.	Population middle 1914, estimated.						
		No.	No.	Ratio.	No.	Ratio.	No.	Ratio.
England and Wales	37,338,	37,303,	334,962	8·97	814,527	21·83	562,326	15·07
Scotland	19,070,	4,729,	34,852	7·37	114,204	23·57	81,629	17·26
Ireland	20,345,	4,381,	24,168	5·51	95,695	21·84	76,169	17·38
Great Britain and Ireland	76,753,	46,413,	393,982	8·49	1,024,426	22·07	720,124	15·51

Trade of United Kingdom, 1915-1914-1913.—*Declared Real Value (Ex-duty) of* **Imports** *at Port of Entry, and therefore including Freight and Importer's Profit; and the Distribution of* **Exports** *of British and Irish Produce and Manufactures from the United Kingdom, according to their Declared Real Value.*

[000's omitted.]

Merchandise (*excluding Gold and Silver*) Imported from, and Exported to, the following Foreign Countries, &c.	1915.		1914.		1913.	
	Imports from	*Exports to*	Imports from	*Exports to*	Imports from	*Exports to*
	£	£	£	£	£	£
Russia	21,429,	13,290,	28,120,	13,863,	40,275,	18,116,
Sweden	19,818,	6,290,	14,199,	7,723,	14,214,	8,233,
Norway	13,692,	7,314,	7,628,	6,493,	7,470,	6,148,
Denmark*	22,597,	8,037,	25,373,	5,834,	23,836,	5,790,
Germany†	201,	138,	46,928,	23,075,	80,511,	40,695,
Holland	23,440,	19,130,	24,338,	13,365,	23,565,	15,477,
Java	12,216,	5,181,	12,320,	5,349,	2,089,	5,713,
Belgium†	1,576,	187,	16,104,	8,263,	23,385,	13,263,
France†	31,470,	72,638,	37,792,	25,861,	46,349,	28,957,
Portugal†	3,975,	4,744,	3,174,	2,762,	3,018,	3,273,
Spain†	18,933,	7,471,	14,125,	6,386,	14,389,	7,892,
Italy†	11,268,	13,954,	8,716,	12,862,	8,133,	14,606,
Austria-Hungary	43,	—	4,393,	2,668,	7,709,	4,482,
Greece	3,943,	2,475,	2,385,	2,895,	2,143,	2,538,
Roumania	5,	487,	3,233,	1,938,	20,014,	1,943,
Turkey (European and Asiatic) and Crete	1,320,	374,	4,052,	5,895,	5,428,	7,742,
Egypt	—	—	17,098,	7,752,	21,406,	9,807,
Philippine Islands and Guam	2,130,	565,	1,615,	789,	2,183,	983,
China‡	7,066,	8,548,	4,780,	12,990,	4,674,	14,848,
Japan§	9,414,	4,872,	4,109,	8,363,	4,388,	14,542,
United States	238,006,	26,170,	138,616,	34,170,	141,706,	29,309,
Peru	3,323,	591,	2,945,	1,061,	3,179,	1,490,
Chile	9,612,	1,761,	5,349,	3,749,	5,315,	6,010,
Brazil	8,344,	5,146,	7,998,	6,265,	10,064,	12,461,
Argentine Republic	63,887,	11,506,	37,151,	14,597,	22,498,	22,627,
Other countries	53,520,	15,140,	36,817,	23,665,	19,514,	33,207,
Total—Foreign Countries	581,228,	236,285,	509,358,	258,633,	577,455,	330,152,
BRITISH POSSESSIONS.						
Channel Isles	2,032,	1,463,	2,272,	1,364,	1,984,	1,353,
Nigerian Protectorate	6,034,	3,202,	4,742,	3,951,	3,891,	3,727,
Cape of Good Hope	7,190,	8,048,	7,549,	9,222,	9,381,	10,824,
British India (including Burmah)	62,341,	45,572,	43,414,	62,981,	48,449,	70,315,
Straits Settlements (including Malay States)	20,016,	4,293,	16,393,	5,702,	19,377,	7,169,
Ceylon	12,259,	1,947,	8,126,	2,848,	7,804,	4,183,
Australia	45,281,	28,912,	36,956,	33,631,	38,068,	34,483,
New Zealand	30,417,	9,380,	22,978,	9,422,	20,338,	10,833,
Canada	41,001,	13,303,	31,419,	17,264,	30,495,	23,724,
British West Indies (including Bahamas)	4,121,	1,881,	2,402,	2,402,	2,138,	2,399,
Other Possessions	41,835,	30,363,	11,824,	22,811,	9,654,	26,299,
Total—British Possessions	272,528,	148,362,	188,075,	171,598,	191,579,	195,309,
Total — Foreign Countries and British Possessions	853,756,	384,647,	697,433,	430,231,	769,034,	525,461,

* Including Faröe Islands.

† Excluding Colonies.

‡ Excluding Hong Kong, Macão, and Wei-hai-Wei.

§ Including Formosa.

Trade of United Kingdom, for the Years 1910-1915.—*Declared Value of the Total Exports of* **Foreign** *and* **Colonial** *Produce and Manufactures from the United Kingdom to each Foreign Country and British Possession.*

Merchandise Exported to the following Foreign Countries, &c.	[000's omitted.] 1915	1914.	1913.	1912.	1911.	1910.
	£	£	£	£	£	£
Russia	11,472,	7,351,	9,589,	7,992,	8,806,	8,956,
Sweden and Norway	5,938,	2,016.	1,529,	1,439,	1,626,	1,592,
Denmark*	4,148,	1,364,	586,	621,	564,	547,
Germany†	—	13,347,	19,878,	19,223,	18,075,	17,943,
Holland†	12.125,	7,309.	5,128.	5,095,	4,722,	5,143,
Java	132	44.	46,	31,	37,	23,
Belgium	46,	4,973,	7,405,	7,361,	7,252	6,903,
France†	12,604,	9,274,	11,920,	12,007,	11,159.	11,065,
Portugal†	830,	545.	662,	594,	584.	562,
Spain†	1,265,	766,	763,	790,	572,	524,
Italy†	3,690.	1,044.	1,014,	999,	1,383.	1,925,
Austria-Hungary	—	761,	1,304,	1,219,	1,348,	1,118,
Greece	175,	66,	59,	35,	47,	29,
Roumania	8.	51,	71,	91,	79,	54,
Turkey (European and Asiatic) and Crete	52,	103,	250,	221,	265,	195,
Egypt	—	177.	160,	153,	147.	166,
Philippine Islands and Guam‡	25,	54,	61,	45,	35,	36,
China‡	79,	123,	168,	113,	126,	146,
Japan §	300,	206,	296,	240,	257,	272,
United States	29,375,	29,992,	30,239,	34,583,	28,560,	30,748,
Peru	55,	78,	105,	115,	100,	119,
Chile	229,	254,	357,	349,	333,	326,
Brazil	427,	338,	555,	511,	451,	387,
Argentine Republic	596,	504,	803,	774,	717,	624,
Other countries	2,794,	2,476,	3,129,	2,773,	2,386,	2,309,
Total to Foreign Countries	86,665,	83,216,	96,077,	97,374,	89,631,	91,712,
BRITISH POSSESSIONS.						
Channel Islands	342,	272,	251,	284,	241,	249,
Nigerian Protectorates	—	275.	219,	291,	262.	244,
Cape of Good Hope	852,	821,	957,	957,	872,	821,
Brit. India (including Burmah)	1,047,	950,	1,423,	2,148,	1,616,	1,030,
Straits Settlements (including Malay States)	158,	126,	214,	147,	124,	117,
Ceylon	113,	116,	131,	122,	103,	135,
Australia	2,902,	3,447,	3,370,	3,448,	3,655,	3,112,
New Zealand	754,	1,001,	913,	795,	793,	751,
Canada	2,743,	3,124,	3,511,	3,789,	3,007,	2,915,
British West Indies (including Bahamas)	406,	386,	394,	398,	459,	470,
Other Possessions	2,815,	1,756,	2,166,	2,085,	1,957,	1,890,
Total to British Possessions	12,132,	12,274,	13,579,	14,464,	13,089,	12,064,
Total to British Possessions and Foreign Countries	98,797,	95,490,	109,656,	111,838,	102,720,	103,776,

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* Including Faröe Islands, Iceland and Greenland.

† Excluding Colonies.

‡ Excluding Hong Kong, Wei-hai-Wei and Macão.

§ Including Formosa.

Vol. LXXIX.] [Part III.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

MAY, 1916.

War Finance.

By Sir George Paish.

[Read before the Royal Statistical Society March 21, 1916,[1] the President, the Right Hon. Lord George Hamilton, G.C.S.I., in the Chair.]

The statistics which I have brought together concerning the war finance of Great Britain during the great struggle which now seems to be approaching its final stages fully support the conviction that has been held in all parts of the world for a great many years that Great Britain is extraordinarily strong from the financial as well as from the economic standpoint. Prior to the war some uneasiness was felt lest the great increase in governmental expenditure and in taxation for purposes of social reform should weaken the financial strength of the country in a period of war and should prevent it from raising all the money it might need to raise for war purposes. I do not think I shall be accused of going beyond what the evidence indicates when I affirm that the financial strength of Great Britain in war has proved to be much greater even than it was believed to be and that its financial strength in peace, great as it was, did not indicate the full measure of its war strength. In compiling the Census of Production Mr. Flux calculated that the income of the United Kingdom was somewhere between 1,918,000,000*l.* and 2,158,000,000*l.*, and if one adopts the larger figure and adds on a very substantial sum in respect of the growth of income between 1907 and 1914 the total income of the nation prior to the war was not more than 2,400,000,000*l*. This was the income of our 46,000,000 of people, or, deducting the children, of some 30,000,000 of persons of whom rather more than 20,000,000 were employed. Beyond this income the country possessed a great amount of accumulated wealth. There is much difference of opinion as to how much the wealth of the United Kingdom really is. My own calculations satisfy me that that wealth is not less than 17,000,000,000*l*. It is, however, of very great importance to remember that accumulated wealth is for the most part merely the land on which we live, manufacture, trade and grow our crops, our factories, railways, machinery, shops, houses, furniture, &c., and that its value consists in its use for purposes of production and of income.

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[1] The Paper has been brought up to March 31, 1916, and the taxation proposals contained in Mr. McKenna's 1916 budget inserted.

Only to a very small extent can accumulated wealth be realized when a nation wishes to consume a much greater quantity of goods than its own production and income permit. Fortunately, the wealth of Great Britain has been expended in such a manner that the British people have been able to maintain their productive power in war at a very high level. No small part of that wealth was placed in factories and machinery, which during the war have in many cases performed double or even treble service. Again, a considerable amount of wealth was placed in shipping, and during the war our mercantile marine has rendered great service in maintaining the income and financial strength of the country. Then, again, a large part of our wealth consists of farms, which have produced a substantial part of the food we need.

Thus our accumulated wealth for the greater part consists of the machinery of production, using the term in its broadest sense, of use for the purpose of production, but unavailable for any other purpose than production. Beyond the wealth we have built up at home in this manner, we have invested abroad a very large sum of money, and for all practical purposes this is the only part of our accumulated wealth that we are able to turn into consumable goods in order to supplement the nation's own productive power and income. According to the data available, the wealth of this country invested overseas prior to the war was no less than 4,000,000,000*l*. These factors, then, the power to make full use of their machinery of production and of distribution, to draw a substantial income from their capital abroad, and to realize a part of the capital they had invested abroad, have enabled the British people to provide the great sums of money they have spent upon the war.

In calculating the income of the country available for war, it is essential to note that since the war began wages and profits have substantially risen, and that, including the sums of money paid to soldiers and sailors, the nation's income since the war began has risen from about 2,400,000,000*l.* to about 3,000,000,000*l.* per annum. I would specially point out, however, that this increase of income does not mean a corresponding increase in production. Since the war began prices of all commodities have greatly risen, the advance since June, 1914, according to Sauerbeck's figures, having been no less than 57 per cent., the index number of 45 commodities which in June, 1914, was 81·2 at the end of February this year standing at 127·6. Measured by productive power and excluding the invaluable services rendered by our soldiers and sailors, the income of the country has been somewhat reduced since the war began. Nevertheless, measured by the profit on capital and the sums paid in wages, and including the sums paid to His Majesty's forces, the nation's income has substantially risen, and it is this greater income that is available for meeting the expenses of the war and providing for the maintenance of the civilian population. Probably we shall have to wait until the war is over for complete and definite information as to the sum received in the aggregate by all the members of the community at the present time. As far as the available data permit an opinion to be formed, the sums paid in wages, including the sums paid to soldiers, sailors and their dependants, have increased about 300,000,000*l.*, while the profits accruing to capital have increased another 300,000,000*l.*, thus raising the total income of the country at the present time to about 3,000,000,000*l.*

According to the Board of Trade *Labour Gazette*, the sums paid in wages with fewer persons employed have substantially increased, and the evidence furnished by the data given in the *Labour Gazette* is confirmed by the experience of bankers, who find that the cheques presented for the payment of wages throughout the country from week to week are as large as, or larger than, they were prior to the war, in spite of the great number of men that have joined the Army and have been withdrawn from industry. The information is not yet available as to how far male labour has been replaced by female labour; but the available evidence indicates that in a very large measure the work hitherto performed by men now at the front is being performed by women who previously were unemployed or whose productive power and income were very small. Furthermore, in times of peace a great many persons are engaged in work which does not appreciably contribute to the productive power of the country. Thus, nearly 500,000 males were in domestic service—a service which in war can be dispensed with without loss. Again, about 1,250,000 men are normally engaged in the building trade. With only a very small amount of capital available for buildings and works of construction in time of war, a large number of these men are set free for war and for other purposes. Indeed, a detailed examination of the occupations in which labour is normally employed clearly shows that a very large proportion of our people is normally engaged in services which do not immediately add to production, that these people form what may be termed a labour reserve for war purposes, and that in time of war this reserve becomes available for maintaining the productive power of the country. Since the war began there has consequently been a great shifting of labour into the highly-paid trades, including, of course, the munitions industries. Lastly, in normal times very few people work up to the limits of their capacity and can largely increase their productive power in time of war. As far as the information is available, it is evident that the country still possesses some reserves of labour which can be drawn upon to replace the additional men now being recruited; but it is obvious that the great margin of potential productive capacity which the nation possessed before the war has now almost disappeared with nearly 4,000,000 of men called to the Colours, with so many men in the Navy and with a great demand for labour for the making of munitions. Indeed, it is evident that when the new armies are formed it will be imperative for everyone to work more efficiently and harder than ever before in order to maintain the production and income of the nation and to meet the expenses of the war. To show how appreciably the income paid in wages has increased I reproduce from the *Labour Gazette* the percentage increases or decreases in the numbers employed in various industries by employers furnishing information to the Board of Trade and the percentage increases or decreases in the actual wages paid by those employers in 1916 on 1915, in 1915 on 1914 and in 1916 on 1914 :—

Employment and Wages, Middle January, 1916.

	Numbers employed.			Sums paid in wages.		
	1916 on 1915.	1915 on 1914.	Balance 1916 on 1914.	1916 on 1915.	1915 on 1914.	Balance 1916 on 1914.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Cotton	− 0·3	− 7·4	− 7·7	+15·8	−13·1	+ 0·6
Woollen	+ 1·6	+ 0·1	+ 1·7	+11·0	+14·1	+26·6
Worsted	− 3·5	− 0·6	− 4·0	+11·9	+ 4·2	+16·6
Linen	− 6·3	− 5·2	−11·1	+14·1	−17·0	− 5·3
Jute	+ 3·0	− 4·8	− 2·0	+29·8	− 5·4	+22·7
Hosiery	+ 4·7	+ 3·4	+ 8·2	+20·1	+11·6	+34·0
Lace	+ 5·3	−21·0	−16·9	+36·8	−34·6	−10·6
Other textiles	− 2·6	−12·3	−14·5	+13·8	−16·7	− 5·3
Bleaching, dyeing, etc.	+ 6·8	−12·7	− 6·8	+32·5	−12·3	+16·2
Total textiles	− 0·3	− 6·0	− 6·3	+17·4	− 8·7	+ 7·1
Boot and shoe	− 2·6	− 0·1	− 2·7	+ 8·2	+11·1	+20·2
Shirt and collar	− 0·5	− 5·2	− 5·6	+11·7	− 9·8	+ 0·7
Pottery	− 1·0	−10·6	−11·4	+20·7	−17·0	+ 0·2
Glass	− 7·2	− 3·0	−10·9	+ 8·9	− 0·1	+ 8·7
Brick	−22·8	−19·4	−37·7	− 8·5	−21·3	−27·9
Food preparation	+13·8	− 6·1	+ 6·9	+28·2	+ 3·3	+32·4

In brief, so far the nation has nearly succeeded in maintaining its productive power in spite of the withdrawal of nearly 4,000,000 of men from industry, and, further, has been able to supplement its income by realizing some part of its accumulated capital invested in foreign countries. The amount of capital that Great Britain has called in from abroad since the war began has been about 500,000,000*l.*, of which about 400,000,000*l.* was called in during the past year and about 100,000,000*l.* in the first five months of war. Nearly the whole of this large amount, however, has been used to make fresh loans to foreign and colonial countries. Consequently, if allowance is made for the increase in the country's stock of gold since war began, it is evident that the nation has succeeded in meeting nearly the whole of its war expenditures out of its income without having needed to draw upon its accumulated capital to an extent worth speaking about, having replaced the capital withdrawn from the United States and other countries with fresh loans to Allies, colonies and neutrals. For the purpose of showing how much capital we have drawn in from abroad and how much we have lent out again since the war began, I present the following statements (1) of our foreign trade for the past three years and (2) of our visible and invisible imports and exports during the first seventeen months of war:—

	1915.	1914.	1913.	Increase or decrease 1915 on 1913.
Merchandise.	£	£	£	£
Imports	853,756,000	696,535,000	768,735,000	+ 85,021,000
Less re-exports	98,797,000	95,474,000	109,757,000	− 10,778,000
Net imports	754,959,000	601,061,000	659,160,000	+ 95,799,000
Exports	384,647,000	430,721,000	525,245,000	− 140,598,000
Excess of imports	370,312,000	170,340,000	133,915,000	+ 236,397,000
Gold.				
Imports	10,828,000	58 642,000	59,534,000	− 48,706,000
Exports	38,618,000	30,599,000	46,087,000	− 7,469,000
Excess of exports	27,790,000	28,043,000*	13,447,000*	+ 41,237,000
Silver.				
Imports	10,560,000	11,953,000	14,495,000	− 3,935,000
Exports	7,361,000	10,889,000	16,055,000	− 8,694,000
Excess of imports	3,199,000	1,064,000	1,560,000†	+ 4,759,000
Total Trade.				
Excess of imports	345,721,000	199,447,000	145,802,000	+ 199,919,000

* Excess of imports. † Excess of exports.

Great Britain's foreign trade balance, first seventeen months of war.

	Year 1915.	Five months to December 31, 1914.
	£	£
Net excess of imports	370,000,000	102,000,000
Imports of Government stores, &c.	120,000,000	20,000,000
Net imports	490,000,000	122,000,000
Loans to foreign and colonial countries	350,000,000	100,000,000
Total	840,000,000	222,000,000
Income from interest, shipping, &c.	425,000,000	150,000,000
Balance	415,000,000	72,000,000
Net imports or exports of gold	Exp. 28,000,000	Imp. 50,000,000
Net imports of silver	3,000,000	2,000,000
Balance provided by sales of securities and by withdrawals of capital from abroad.	390,000,000	124,000,000

These statements of our foreign trade and of our trade balance are important, not merely for the purpose of showing the manner in which the country's consumption has been maintained, but also for indicating the manner in which we have paid for our imports and have been able to lend money to our Allies, colonies and customers during the war to the extent of no less than 450,000,000*l.* It will be noted that our imports last year showed a very great increase in comparison with the calendar year immediately prior to the war, even if no account is taken of the substantial amount of Government stores purchased abroad and not included in the returns. Including the purchase of Government stores, the value of our total imports last year was not far short of 1,000,000,000*l.*, while the value of our imports for consumption was nearly 900,000,000*l.*, thus showing an increase of some 216,000,000*l.* in comparison with 1913. In part, however, these great imports were brought about by the great rise in prices. According to a calculation in the *Statist* the net imports for home consumption, excluding Government stores not included in the trade returns, declined nearly 2 per cent. in quantity, but increased as much as 14·5 per cent. in value compared with 1913. In other words, the average rise in prices was 16·6 per cent. That is to say, the rise in prices accounted for 108,000,000*l.* of the increase of 216,000,000*l.* in imports for consumption. Still, when allowance is made for the influence of prices, it is obvious that the nation's consumption of goods was substantially greater in 1915 than in 1913. When one realizes the insular position of this country and its dependence upon overseas supplies of food and material, its success in importing such vast quantities of goods is no mean triumph and gives eloquent testimony to the effective work of the British Navy in maintaining the freedom of the seas.

Furthermore, the ability of the country to export last year no less than 384,000,000*l.* of British goods, in spite of the great disturbance to commerce and to our industries caused by the war, is matter for general congratulation, not only on account of the purchasing power which these exports gave to the British people, but more especially on account of the power which these exports gave to the allied nations to purchase the goods they needed from the whole world for the prosecution of the war.

The adverse effect on Great Britain's purchasing power of the rise in the prices of imports was offset in some measure by the rise in the prices of exports, which gave an advantage of 28,000,000*l.* to the country, and was neutralized further by the rise in freights, which gave the country a much larger income than before. Still, on

Value of foreign trade of the United Kingdom in 1913 *and* 1915.

	Actual, 1915.	1915 at prices of 1913.	Actual, 1913.	Increase or decrease, 1915, compared with 1913.					
				Actual.		Due to higher (+) or lower (−) prices.		Due to larger (+) or smaller (−) quantities.	
Total imports.	£	£	£	£	P. ct.	£	P. ct.	£	P. ct.
I. Food, drink and tobacco	381,901,000	292,138,000	290,202,000	+ 91,699,000	+31·6	+89,763,000	+30·7	+ 1,936,000	+ 0·7
II. Raw materials and articles mainly unmanufactured	287,341,000	298,261,000	281,823,000	+ 5,518,000	+ 2·0	−10,920,000	− 3·7	+ 16,438,000	+ 5·8
III. Articles mainly or wholly manufactured	181,515,000	163,091,000	193,602,000	− 12,087,000	− 6·2	+18,424,000	+11·3	− 30,511,000	−15·7
IV. Miscellaneous and unclassified	2,999,000	2,940,000	3,108,000	− 109,000	− 3·5	+ 59,000	+ 2·0	− 168,000	− 5·4
Total imports	853,756,000	756,430,000	768,735,000	+ 85,021,000	+11·1	+97,326,000	+12·9	− 12,305,000	− 1·6
Re-exports.									
I. Food, drink and tobacco	22,384,000	21,880,000	15,942,000	+ 6,442,000	+40·4	+ 504,000	+ 2·3	+ 5,938,000	+37·3
II. Raw materials and articles mainly unmanufactured	54,574,000	64,725,000	64,038,000	− 9,464,000	−14·8	−10,151,000	−15·7	+ 687,000	+ 1·1
III. Articles mainly or wholly manufactured	21,781,000	22,520,000	29,458,000	− 7,677,000	−26·0	− 739,000	− 3·3	− 6,938,000	−23·5
IV. Miscellaneous and unclassified	58,000	58,000	137,000	− 79,000	−57·7	—	—	− 79,000	−57·7
Total re-exports	98,797,000	109,183,000	109,575,000	− 10,778,000	− 9·8	−10,386,000	− 9·5	− 392,000	− 0·3

Value of foreign trade of the United Kingdom in 1913 *and* 1915.—*Contd.*

	Actual, 1915.	1915 at prices of 1913.	Actual, 1913.	Increase or decrease, 1915, compared with 1913.					
				Actual.		Due to higher (+) or lower (−) prices.		Due to larger (+) or smaller (−) quantities.	
Net imports.	£	£	£	£	P. ct.	£	P. ct.	£	P. ct.
I. Food, drink and tobacco	359,517,000	270,258,000	274,260,000	+ 85,257,000	+31·1	+ 89,259,000	+33·0	− 4,002,000	− 1·5
II. Raw materials and articles mainly unmanufactured	232,767,000	233,536,000	217,785,000	+ 14,982,000	+ 6·9	− 769,000	− 3·3	+ 15,751,000	+ 7·3
III. Articles mainly or wholly manufactured	159,734,000	140,571,000	164,144,000	− 4,410,000	− 2·7	+ 19,163,000	+13·6	− 23,573,000	−14·4
IV. Miscellaneous and unclassified	2,941,000	2,882,000	2,971,000	− 30,000	− 1·0	+ 59,000	+ 2·1	− 89,000	− 3·0
Total net imports	754,959,000	647,247,000	659,160,000	+ 95,799,000	+14·5	+107,712,000	+16·6	− 11,913,000	− 1·8
Domestic exports.									
I. Food, drink and tobacco	24,996,000	21,580,000	32,588,000	− 7,592,000	−23·3	+ 3,416,000	+15·9	− 11,008,000	−33·8
II. Raw materials and articles mainly unmanufactured	52,355,000	44,397,000	69,905,000	− 17,550,000	−25·1	+ 7,958,000	+17·9	− 25,508,000	−36·4
III. Articles mainly or wholly manufactured	292,788,000	276,538,000	411,368,000	−118,580,000	−28·8	+ 16,250,000	+ 5·9	−134,830,000	−32·8
IV. Miscellaneous and unclassified	14,508,000	14,532,000	11,384,000	+ 3,124,000	+27·4	− 24,000	− 0·1	+ 3,148,000	+27·7
Total Exports	384,647,000	357,047,000	525,245,000	−140,598,000	−26·8	+ 27,600,000	+ 7·7	−168,198,000	−32·0

balance the rise in prices did substantially reduce the purchasing power of Great Britain. For the purpose of showing how far the values of our imports and exports in 1915 in comparison with 1913 were due to the higher prices, I reproduce on pages 274 and 275 the statement from a recent issue of the *Statist*.

Thus, as far as the available data permit an opinion to be formed, the small decline in production in Great Britain in 1915 was offset by increased imports from abroad, due mainly to Government purchases and by reduced exports, and the country's consumption in 1915 was much greater than it was in 1913, the last complete year of peace.

Further, as far as the available information permits one to form an opinion, it is evident that the wealthier classes of the country have been more economical than usual, while the additional earnings of the working classes arising from the shifting of labour to more highly-paid industries, full employment with much overtime, advances in the rates of wages and allowances to the families of soldiers and sailors, completely neutralized the advance in the cost of living and caused the consumption of the working classes to show marked increase.

This brings me to the actual sum raised and spent for war purposes. At the very outbreak of war it became evident that Great Britain would not only have to contribute a great navy and to supply much money to the Allies' cause, but would have to raise a great army also if victory was to be won; and from that time to this the army has grown until its numbers are now greater than anyone ever supposed they would be, and it is still growing. Consequently, the expenditure upon the war has increased rapidly from day to day ever since war began, and even now that the expenditure is approaching to 5,000,000*l*. per day, the increase continues. Indeed, the Prime Minister recently asked Parliament to sanction expenditure for war purposes alone at the rate of 5,000,000*l*. a day over and above the 500,000*l*. a day now needed to meet interest and other governmental expenditures. In the period from the end of July, 1914, to the end of March, 1915, the war expenditures amounted to 362,000,000*l*. and the total expenditure of the twelve months was no less than 560,000,000*l*., in comparison with 197,000,000*l*. in the previous fiscal year. The war expenditure was over and above the normal expenditure upon the army and navy. Including the normal army and navy expenditures, the outlay for war purposes in the first eight months of war was 415,000,000*l*. and, including loans to Allies and Colonies made by the Bank of England amounting to 160,000,000*l*., the aggregate was 575,000,000*l.* In the current fiscal year the war expenditure is expected to reach the great sum of 1,420,000,000*l.*[2] excluding interest on war loans, and excluding the repayment of 160,000,000*l.* to the Bank of England, and according to the Prime Minister's statement the estimated expenditure in April and May alone will reach 300,000,000*l.* The Votes of Credit asked for by the Government since war began have been as follows :—

Votes of Credit.

Date of Treasury notice.	Amount.	Total for each fiscal year.
1914–15—	£	£
August 5, 1914	100,000,000	
November 12, 1914	225,000,000	
February 25, 1915 ...	37,000,000	
		362,000,000
1915–16—		
February 25, 1915....	250,000,000	
July 10, 1915	250,000,000	
July 19, 1915	150,000,000	
September 14, 1915	250,000,000	
November 9, 1915....	400,000,000	
February 17, 1916.... ...	120,000,000	
		1,420,000,000†
1916–17—		
February 17, 1916....	300,000,000*	
		300,000,000
Total	—	2,082,000,000

* Two months to end of May, 1916.

† Excluding 160,000,000*l.* repaid to Bank of England expended in previous year.

The amount of new taxation imposed by Mr. Lloyd George in 1914 and by Mr. McKenna in September, 1915, and April, 1916, is shown by the following statement :—

New taxation.

Budget—	£
April, 1914	13,519,000
November, 1914	72,100,000
September, 1915	111,912,000
April, 1916	72,950,000
Total	270,481,000

If these expected amounts of new taxation are added to the revenue of 1913–14 one arrives at an aggregate of 471,724,000*l.*, whereas the expected revenue for 1916–17 is placed at 502,275,000*l.*

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[2] The actual expenditure of 1915–16 was 1,559,158,000*l.* excluding the 160,000,000*l.* repaid to the Bank of England. Of this total the sums actually expended under the war credits was 1,399,652,000*l.*

Revenue, 1916–17, *apart from expansions since* 1913–14.

	£
Revenue, 1913–14	198,243,000
New taxation	270,481,000
Total revenue	468,724,000

Excluding the new taxes imposed by Mr. Lloyd George in April, 1914, which were not war taxes, the taxation imposed for war purposes has been 259,595,000*l.*, of which it is expected that the new Customs and Excise duties will yield 62,000,000*l.*; that the income tax, super-tax and excess profits tax will realize 193,000,000*l.*; and that the additional postal, telegraph and telephone charges will bring in an extra 2,000,000*l.* How the additional war taxation has been raised is shown by the following statement :—

Additional war taxation.

	£
Additional customs and excise	61,780,000
Income tax, super tax and excess profits tax	192,835,000
Total	254,615,000
Addition to postal, telegraph and telephone charges	1,980,000
Total	256,595,000

For the purpose of showing how much revenue would be derived from the various sources of income on the assumption merely that the estimated sums realized from the new taxation will not be exceeded, I give the following statement :—

Great Britain's revenue showing estimated yields of new taxes.

	Actual 1913–14.	Estimated 1916–17.	Increase or decrease.
	£	£	£
Customs	35,450,000	72,850,000	+ 37,400,000
Excise	39,590,000	63,420,000	+ 23,830,000
Estate, &c., duties	27,359,000	32,603,000	+ 5,244,000
Stamps	9,966,000	9,966,000	—
Land tax and house duty	2,700,000	2,700,000	—
Income and super tax	47,249,000	201,276,000	+ 154,027,000
Excess profits duty	—	48,000,000	+ 48,000,000
Land value duties	715,000	715,000	—
Total taxes	163,029,000	431,530,000	+ 268,501,000
Postal service	21,190,000	22,695,000	+ 1,505,000
Telegraphs	3,080,000	3,350,000	+ 270,000
Telephones	6,530,000	6,735,000	+ 205,000
Crown lands	530,000	530,000	—
Suez Canal and sundry loans	1,580,000	1,580,000	—
Miscellaneous	2,304,000	2,304,000	—
Non-tax revenue	35,214,000	37,194,000	+ 1,980,000
Total	198,243,000	468,724,000	+ 270,481,000

In making the above calculation I have merely taken into account the expected yield from the new taxes imposed since 1913–14, and I have made no allowance whatever for the actual expansions or contractions in revenue in 1914–15 and in 1915–16, or the expected expansions or contractions in 1916–17. The calculation is simply the estimated yields from the new taxes added to the actual revenue for 1913–14. The estimated revenue for 1916–17, including the new taxes and the expansion due to the country's great expenditures is 499,275,000*l*.

The progressive character of the war expenditure is shown by the following statement of the expenditure quarter by quarter since the outbreak of war:—

	Number of days.	Expenditure.	
		Total.	Per day.
		£	£
August 2 to September 30, 1914	60	71,684,000	1,195,000
October 1 to December 31, 1914	92	186,098,000	2,023,000
January 1 to March 31, 1915	90	240,578,000	2,673,000
April 1 to June 30, 1915	91	258,473,000	2,840,000
July 1 to September 30, 1915	92	416,024,000	4,522,000
October 1 to December 31, 1915	92	425,420,000	4,624,000
January 1 to March 31, 1916	91	459,241,000	5,046,000
Total	608	2,057,518,000	3,384,000
Repayment to Bank of England	—	160,428,000	—
Total	608	2,217,946,000	3,648,000

This great war expenditure has been met in part by additional taxation. In 1913–14, prior to the war, the governmental revenue was 198,243,000*l*. For the purpose, among other things, of relieving local taxation, 13,519,000*l*. of new taxes were imposed in the Budget presented in April, 1914. In November, 1914, Mr. Lloyd George imposed new taxes which were expected to bring in a sum of 72,100,000*l*. in a complete year. These new taxes consisted of additions to income tax and super-tax and higher duties upon tea and beer. In September, 1915, Mr. McKenna, the new Chancellor of the Exchequer, imposed fresh taxation, expected to bring in 111,912,000*l*., but which is likely to yield a very much larger sum. Thus, according to the official calculation, the new taxation imposed up to March, 1916, including the taxes imposed in April, 1914, has been as much as 197,531,000*l*. The expected expansion in revenue was placed at a somewhat lower figure than this sum, as it was thought probable that the war would cause other taxation to be less fruitful; but in consequence of these new taxes, and also of the expansion in revenue that has come through war-time consumption of taxable articles, the revenue rose from 198,000,000*l*. in 1913–14 to 227,000,000*l*. in 1914–15. In the past year it was 336,767,000*l*. and this year, when the new taxation will be fully felt, the revenue may reach 426,325,000*l*. [New taxation, estimated to yield 75,950,000*l*., has been imposed since the paper was read and the estimated revenue for 1916–17 is thus brought up to 499,275,000*l*.] In 1914–15 the deficit provided by loan was 334,000,000*l*.; in 1915–16 the deficit reached 1,222,391,000*l*.; and in 1916–17, allowing for the new taxation the Chancellor has imposed, the balance to be covered by loan is 1,326,105,000*l*. For the purpose of showing how much of the war expenditure has been and may be paid out of revenue and how much out of loan, as matters stand at the moment, I give the following statement:—

Great Britain's revenue and expenditure.

	Revenue.	Expenditure.	Balance.
	£	£	£
1916–17 estimated* ...	499,275,000	1,825,380,000	Deficit 1,326,105,000
1915–16†	336,767,000	1,599,158,000‡	,, 1,222,391,000§
1914–15	226,694,000	560,473,000‡	,, 333,779,000
1913–14	198,243,000	197,493,000	Credit 750,000

* These are the official estimates made since the paper was read.

† Actual 1915–16.

‡ Of the expenditure in 1914–15 52,000,000*l*. consisted of loans to Allies and Dominions, in 1915–16 316,000,000*l*., and in 1916–17 these loans are expected to amount to 450,000,000*l*.

§ Beyond these deficiencies 160,427,623*l*. of temporary loans have been repaid to the Bank of England.

Having already shown in the aggregate the additional war taxation imposed, I now set out the additions to customs and excise duties made in the war Budgets of November, 1914, September, 1915, and April, 1916, with the estimated yields of the new taxes:—

War taxes. Customs and excise.

	Prior to war.	November 1914.	September, 1915.	April, 1916.	Estimated yield of tax additions Full year.
	s. d.	s. d.	s. d.	s d.	£
Tea .... per lb.	0 5	0 8	1 0	—	7,700,000
Beer foreign .... per barrel	8 3	25 6	—	—	15,200,000
home .... ,,	7 9	25 0	—		
Cocoa .... per lb.	0 1	—	0 1½	0 6	1,940,000
Coffee .... per cwt.	14 0	—	21 0	42 0	
Chicory customs ,,	13 3	—	19 10	39 8	
excise ,,	12 1	—	18 8	38 6	
Dried fruits—					
Currants .... per cwt.	2 0	—	3 0	—	180,000
Figs, plums, raisins, &c. ,,	7 0	—	10 6		
Sugar customs ,,	1 10	—	9 4	14 0	18,350,000
excise ,,	—	—	7 0	11 8	350,000
Table waters containing sugar, or fermented per gallon	—	—	—	0 4	2,000,000
Other .... ,,	—	—	—	0 8	
Cider and perry.... ,,	—	—	—	0 4	
Tobacco, unmanufactured and unstripped* .... per lb.	3 8	—	5 6	—	5,100,000
Motor spirit .... per gallon	0 3	—	0 6	—	1,100,000
Patent medicines, per 1s. bottle	0 1½	—	0 3†	—	250,000
Matches—					
Small boxes:					
Customs, per 10,000 matches	—	—	—	3 6	2,000,000
Excise ,, ,,	—	—	—	3 4	
Large boxes:					
Customs ,, ,,	—	—	—	1 9	
Excise ,, ,,	—	—	—	1 8	
Cinema films, clocks and parts, watches and parts, musical instruments	—	—	*ad valorem* 33⅓ per cent.	—	660,000
Imported motor cars and motor cycles	—	—	*ad valorem* 33⅓ per cent.	—	1,150,000
Motor car, licence duty—					
Not exceeding 16 h.p.	2*l*. 2*s*. to 4*l*. 4*s*.	—	—	4*l*. 4*s*. to 8*l*. 8*s*.	800,000
Exceeding 16 h.p.	6*l*. 6*s*. to 42*l*.	—	—	18*l*. 18*s*. to 126*l*.	
Motor cycles—					
Not exceeding 4 h.p.....	1*l*.	—	—	2*l*. 2*s*.	
Exceeding 4 h.p.		—	—	¾ of duty payable in case of a motor car	

* All duties on tobaccos were correspondingly increased.

† Dearer medicines increased in proportion.

War taxes. Customs and excise—contd.

	Prior to war.	November, 1914.	September, 1915.	April, 1916.	Estimated yield of tax additions Full year.
	s. *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	£
Entertainments—					
Up to 2*d.*	—	—	—	0 0½	5,000,000
2*d.* to 6*d.*	—	—	—	0 1	
6*d.* to 2*s.* 6*d.*	—	—	—	0 2	
2*s.* 6*d.* to 5*s.*	—	—	—	0 3	
5*s.* to 7*s.* 6*d.*	—	—	—	0 6	
7*s.* 6*d.* to 12*s.* 6*d.*	—	—	—	1 0	
Every 10*s.* or part of 10*s.* over 12*s.* 6*d.*	—	—	—	1 0	
Total customs and excise....	—	—	—	—	61,780,000

The greater part of the war taxation has come from income tax, super-tax and excess profits tax. These are expected to bring in a sum of about 193,000,000*l.* in the new year, but the probable yield is likely to be very much greater. The estimated yields from the additions to these taxes are shown below :—

War taxes. Income tax, super-tax and excess profits tax.

	Prior to war.	November, 1914.	September, 1915.	April, 1916.	Estimated yield of new taxes.
					£
Income tax*	1*s.* 2*d.* per £	2*s.* 6*d.*	3*s.* 6*d.*	5*s.* 0*d.*†	134,400,000
Super-tax	6*d.* per £ over £5,000	10*d.* to 2*s.* 8*d.* graduated from £2,500 to £8,000	10*d.* to 3*s.* 6*d.* graduated from £2,500 to £10,000	—	10,435,000
Excess profits tax	Nil	Nil	50 per cent.	60 per cent.	48,000,000
Total	—	—	—	—	192,835,000

* The basis of taxation under Schedule B (charged in respect of the occupation of lands) from one-third to the full amount of the annual value.

† Graduations also changed. Rate 2*s.* 3*d.* in the £ on *earned* incomes not exceeding 500*l.*, 2*s.* 6*d.* from 500*l.* to 1,000*l.*, 3*s.* from 1,000*l.* to 1,500*l.*, 3*s.* 8*d.* from 1,500*l.* to 2,000*l.*, 4*s.* 4*d.* from 2,000*l.* to 2,500*l.*, 5*s.* over 2,500*l.* Rate 3*s.* in £ on *unearned* incomes not exceeding 300*l.*, 3*s.* 6*d.* from 300*l.* to 500*l.*, 4*s.* from 500*l.* to 1,000*l.*, 4*s.* 6*d.* from 1,000*l.* to 2,000*l.*, 5*s.* over 2,000*l.*

If it be assumed that practically the whole of the indirect taxation of the country is paid by the working classes (and obviously a portion of the indirect taxation is paid by the wealthy classes), it is clear that, including the new taxes and allowing for the increase in the income of the working classes, the burden of taxation is still a very light one.

Immediately after the Napoleonic wars, when the income of the country was calculated to be only about 300,000,000*l.*, the annual sum raised in taxation was 62,000,000*l.*, and taxation thus bore a proportion to the income of over 20 per cent. With a national income at the present time of some 3,000,000,000*l.*, including the remuneration paid to the army and navy, a governmental revenue of 500,000,000*l.* still represents only about 17 per cent. of the nation's income. And the burden of this rate of taxation is, of course, immeasurably less with so great an income than the same rate of taxation was with the much smaller income of one hundred years ago.

The nation's Debt before the war was 707,000,000*l.* At the end of March, 1915, the Debt was about 1,273,000,000*l.*, and at the end of March, 1916, it was about 2,450,000,000*l.*, less the Debt cancelled by conversion, particulars of which are not yet available. The approximate amounts of British Debt at the present time and at the end of March, 1915, are as follows :—

British debt, 1916 *and* 1915.

	March 31, 1916.	March 31, 1915.
	£	£
Pre-war debt	707,654,000	707,654,000
Treasury bills	551,326,000	61,650,000
3 per cent. Exchequer bonds, 1920	50,000,000	47,700,000
5 per cent. Exchequer bonds, 1920	153,689,000	—
3½ per cent. war loan	350,000,000	296,000,000
4½ per cent. war loan, 1925–45	592,345,180	—
American loan	51,560,000	—
Miscellaneous borrowings	19,896,000	160,427,623
Debt redeemed, Cr.	Cr. 26,111,190	—
Total war debt	1,742,704,990	565,577,623
Total debt	2,450,358,990*	1,273,431,623

* Less allowance for Consols converted into 4½ per cent. war loan on the basis of £66 13*s.* 4*d.* per £100.

Moreover, the net Debt is further reduced by an asset of 368,000,000*l.* consisting of loans to Allies and Dominions. The net Debt is thus reduced to under 2,000,000,000*l.*

So far as this country is concerned the approximate cost of the War up to March, 1917, is as follows:—

Great Britain's war bill up to March, 1917.

	1914–15.*	1915–16.*	1916–17.†	Total.
	£	£	£	£
War expenditure‡	597,000,000	1,440,000,000	1,714,000,000	3,751,000,000
Paid out of revenue	103,000,000	218,000,000	391,000,000	712,000,000
Loans	565,000,000	1,177,000,000	1,323,000,000	3,065,000,000
Total revenue and loans	668,000,000	1,395,000,000	1,714,000,000	3,777,000,000

* Actual.

† Estimated.

‡ Including interest on war debt and ordinary expenditure of 80,000,000*l.* a year on army and navy.

Everyone will realize that even for so rich a country as Great Britain the task of finding over 1,800,000,000*l.* for war and for civil government in a single year will not be an easy one. Indeed, for the work to be accomplished it will be essential for every citizen to be as efficient and hard-working as possible, in order to maintain the country's production and its income, and at the same time to be as economical as is compatible with efficiency. Great Britain, in standing by her treaty obligations to defend Belgium and in determining to prevent at all costs the domination of the world by a military oligarchy, will need to put forth her full strength. At one and the same time to maintain the greatest Navy ever brought together, to supply enormous sums of money to her Allies and Colonies, and to place in the field an army which is now fast approaching 4,000,000 of men, at a total cost of over 1,800,000,000*l.*, is, indeed, a task worthy of her great traditions.

Discussion on Sir George Paish's Paper.

The Chairman (The Right Hon. Lord George Hamilton) said it fell to his lot to perform the pleasing task of thanking Sir George Paish for the very interesting Paper he had read to them. The Paper was distinguished by the characteristic lucidity and consecutive sequence of thought which were associated with the writings and speakings of Sir George Paish. He thought Sir George had not laid too much stress on the strength and solidity of their financial and economic system. It had stood a tremendous strain more easily than most of them believed it could do, and he thought they might say that, now they were in the second year of this gigantic war, their economic and industrial system had been much less disturbed than could have been anticipated. He thought Sir George Paish was right in eulogizing the resources of a country which could raise so gigantic a revenue with comparatively little effort, and the whole of the earlier part of his statement was one with which he was in most complete accord. If he did make any criticism on the Paper, he would say that although he was an optimist, and had been an optimist all through his life, the tone of the Paper, he thought, was a little too rosy. With the exception of the warning which was included in the last two or three paragraphs of Sir George's Paper, there was no indication at all of the difficulty, the evils, or the embarrassments which they must necessarily have to face in carrying the gigantic burden of taxation and incurring the enormous increase of borrowing. He thought he might almost say that the cardinal figure in the Paper was the estimate of 3,000 millions as the national revenue at the present moment. He alluded to that figure because it occurred on the first page of the Paper, and also was referred to on the last page of the Paper, and was there referred to as more or less a stable figure on which taxation for the future could be based. Let us look at those figures for a moment. They were told that the national income was estimated by Mr. Flux in 1907, in connection with the Census of Production, at between 1,918 millions and 2,158 millions, and Sir George Paish took, as he was perfectly justified as an optimist in taking, the higher figure. That was the income in 1907. Between 1907 and 1914 he estimated that the income of the country increased by 242 millions, which gave an average of about 35 millions for each of those years. That period was a period of prosperity and peace. The national income increased during that period annually by the amount of 35 millions; but in the two years during which they had been at war, the national income was put up from 2,400 millions to 3,000 millions, or, in other words, in each year of that tremendous strain the national income had increased by 300 millions, or at nearly ten times the rate at which it had increased during prosperity and peace. He did not pretend to be a profound economist, but he ventured to say that that 3,000 millions of national income was not a reliable figure. It had been entirely caused by the gigantic expenditure of the Government; and the Government had had to meet that expenditure by wholesale borrowing. If any young person came into a very large fortune and read this Paper, he was afraid he would consider it a very great encouragement towards the "Rake's Progress," because he would find out that if he chose to increase his spending power by borrowing ten times his income, he would raise the welfare and incomes of the inhabitants of the neighbourhood. As a matter of fact, they all knew that the enormous expenditure of the Government was forced upon them by the exigencies of the war—they must have certain things. They had commandeered the whole of the manhood of the country; they were paying very high wages; they were compelled to buy wholesale certain articles which were necessary for them to convert into munitions of war, and they had paid an enormous price for those articles; and the moment peace was declared, or in sight, the vast majority of that productive work would cease to have any value at all. He therefore contended that 3,000 millions, estimated, of revenue, was not a reliable figure upon which they could make an estimate as regarded future taxation. Another point which occurred to him in connection with the Paper was that a comparison was made between the expenditure in the great Napoleonic War and the expenditure which they were now subject to. The comparison was decidedly in favour of their position now, as compared with the position of their ancestors. It was estimated that assuming the revenue amounted to 450 millions, it would only represent 15 per cent. of the estimated income of the country, and it was pointed out that in the Napoleonic War, the annual sum raised in taxation was about 25 per cent. That was quite true; but the Napoleonic War lasted for twenty years, with an intermission of three years. They were only in the second year of this war, and he wished to call their attention to the estimate of expenditure which was to be found on page 279. Taking the expenditure of this quarter last year, it was nearly double, and if the war went on for any lengthened period, it was quite clear that the 25 per cent. of the national income which was the contribution of their ancestors would be quite equalled, if not exceeded, here. He, therefore, thought that whilst they had every right to take credit to themselves for the splendid financial results achieved out of their system, they ought to bear in mind that there must necessarily be very great difficulties requiring the most complete co-operation and self-sacrifice from all sections of the community to get them successfully through the financial crisis in which they were placed, and which was still ahead of them; and it would not do to take so roseate a view of a fictitious increase of income which was only brought about by wholesale borrowing. He was also afraid (though perhaps it went a little beyond the scope of the Paper) that the gigantic borrowing and enormous amount of purely war employment which it had given would, the moment peace was declared, produce great internal and social difficulties. Their ancestors experienced those difficulties after the great Napoleonic struggle. He was Chairman of the Poor Law Commission that had to investigate the amount of pauperism and the causes of distress in this country; and he did not think there was any one of the economists who were on that body who did not believe that a great many of the evils from which they were now suffering were directly traceable to that great war. Their Poor Rate was two millions at the time war broke out. When the war closed it was eight millions, and they had never got it down since; and he believed a great deal of the troubles connected with the enormous amount of casual labour in this country was almost directly traceable to the system of employment which then sprang up. If they were to draw a comparison at all between their condition then and the condition of their ancestors, there was one very important fact to be borne in mind. He believed what enabled them to carry that tremendous strain was not merely the skill and courage of their soldiers and sailors, but it was the inventive genius of a very distinguished Scotsman by which the steam engine was started, and they had almost the monopoly of the use of that steam engine, and in consequence almost a monopoly of production. It was one of the most extraordinary facts that, in consequence of the omnipotence of English production, when Napoleon invaded Russia, despite his decrees, a large part of his army was armed, booted and clothed by English manufacture. Therefore in that monopoly, which was then only in its infancy, there was a potential development as regarded manufactures which they certainly had not got now. He did not know what the feeling of those he was speaking to was, but Sir George Paish thought that the Income Tax was not unduly burdensome. It was a pretty stiff amount. For people with 10,000*l.* a year it was over 30 per cent., and it would probably go up a good deal higher. They had now to compete with almost every country, and he thought they could not ignore the fact that the cost of production generally in this country must, under the enormously increased taxation, go up, and that they would require very much more strenuous work and closer supervision over individual and manufacturing expenditure than they had exercised before, if they were still to hold their own in the world. He ventured to make the few remarks he had made because he thought they had had a very valuable Paper read to them. Sir George Paish's name stood deservedly high as economist and statistician, but, at the same time, the success with which they had overcome past difficulties ought not to minimize in their view the unquestioned troubles which were ahead. He was very glad to see that Sir George had ended his Paper by pointing out that it was only by patriotic combination, by self-denial in the practice of abstinence, and by increased work in every direction, that they could hope successfully to issue from the difficulties that beset them.

Mr. S. Rowson, in seconding the vote of thanks, said there could be no dispute as to the importance of the Paper which had been read to them, and the competence of the author to discuss the subject of the Paper. Lord George Hamilton had made some references to analogous situations which had arisen in English history in the past. He wished for a moment to dot the i's and cross the t's of some figures to which Lord George had referred, and which were referred to less fully in the Paper by Sir George Paish. That morning he had been looking at some figures which would enable a comparison to be made to the cost during the Napoleonic war and the Boer War, with the cost during the present war. The figures he had taken out related to the cost in the maximum year of those wars with the income and wealth of the nation at those times, according to the best estimates. When Sir George Paish referred to the national income during the Napoleonic wars, he (Mr. Rowson) did not quite know to what year he referred. In 1798 Pitt referred to the taxable income as being about 100 millions. But the year of maximum expenditure of the war was probably 1812, and in that year, according to the estimate of Colquhoun (and he had refreshed his memory from that interesting book which had just been published, written by Mr. Stamp) it was somewhere over 400 millions. The wealth of the country at that time was estimated, on the same authority, he thought, to be 2,700 millions. The total Budget in 1812 was 107 millions, not far from 25 per cent. of the nation's income. The amount raised by taxation, however, was 71 millions, or less than 16 per cent. Comparing those figures with the Boer War, the income of the country at that time was about 1,750 millions. The maximum Budget expenditure in the year 1901–2 was 205 millions, or about 12 per cent., and the amount raised by taxation was about 132 millions in the maximum year. He did not think it mattered whether it was new war taxation or existing taxation, but the amount raised by taxation in the maximum year was about 7 per cent. Comparing those figures with the present time, the income of the nation was from 2,500 millions to 3,000 millions. He thought the explanation of the 3,000 million figure was not that there had been any increase in production, but increase in values on the old basis of production. That was to say if there had been no increase in prices, the income of the nation would have been valued, Sir George Paish said, at 2,500 millions. In his opinion the correct figure was nearer 2,700 millions, and allowing for increased prices, it was near 3,000 millions. Whichever figure was taken, it made very little difference on the big figures with which they were now dealing. The total Budget expenditure was 1,600 millions, or from 50 to 66 per cent. of their national income. That was a very much larger expenditure than had ever been undertaken before in the history of this country, or probably of any country. The amount raised by taxation was 300 millions, which, on the basis of a national income of 2,500 to 3,000 millions, was somewhere less than 10 per cent. He could only quote those figures in that way because they confirmed the figures given by Sir George Paish. The sacrifices they were now making, measured by the taxation imposed, bore a very much smaller proportion to their national income than it did during the Napoleonic War. But apart from that, they were probably greater than they had been in any other time in British financial history. It was certainly a matter for surprise to every thinking person, and certainly to every thinking economist, to find how successfully so far they had dealt with the financial situation. One could only recall the political keenness of the country in the year 1909, when the great naval crisis arose. When they recalled that the question then in issue between the two political parties was whether they should put another Dreadnought on the programme or not, and compared it with the situation now, when they were expending at the rate of two or three Dreadnoughts a day on war, they realized how enormously things had changed, and how readily and efficiently the country was facing the situation which in those days was regarded as being full of crisis, not only politically but financially. He thought the question between Sir George and other financial critics was not on the merits of the financial situation itself, but on the merits of financing that situation. His Lordship had already made one criticism which referred rather to the amount of taxation they proposed in order to meet the immediate burden of war expenditure. The whole question was one of the relative merits in a crisis of this kind of meeting expenditure by taxation as compared with loans. In this country they had always compromised—they had always raised a sum of money by taxation, and a sum of money by loans. Most of them would have read the views of the German Finance Minister the other day, in which he congratulated Germany in that almost all their expenditure was being raised by loan, and minimized the financial stability of this country which perforce was compelled to raise some of its money by taxation. That, of course, was a one-sided view of the matter. He could not put it any higher than that. But really at bottom one saw how one-sided that view was from the fact that apparently in Germany they were going, in the Budget now being passed through the Reichstag, to imitate the bad example of England by proposing taxation to help them through their financial crisis. There was a real economic question as to whether one ought under circumstances like the present to raise any money by taxation, or as much as they were doing, or whether they ought not to postpone the imposition of taxation until after the war was over. The merits of the question could be discussed from various points of view; but, broadly, he thought it resolved itself into whether the taxation which they decided to impose would be repressing on production, or would stimulate production. That was the whole point. One could not really say offhand whether taxation, or any particular kind of taxation, would have the effect of stimulating production or depressing it. On the face of it one would be inclined to say that taxation suddenly increased by some hundreds of millions of pounds at a time when millions of people were withdrawn from normal consumption, was not likely to have the effect of stimulating industry. One could not put it quite so plainly as that, because there were so many other considerations which had to be borne in mind. His view was that it would be better on the whole to postpone a very large part of the war payments until after the war was over, and make every effort now to maintain their national capital at a pre-war level. He agreed with Sir George Paish that the only way of providing a large part of the necessary finance for carrying on the war was by economies in consumption ; because, as he made it out, the necessary economies in consumption in order to maintain production at its normal level, were close on 30 per cent. From 25 to 30 per cent. was the amount by which every private person should reduce his real expenditure, not only his apparent expenditure, if, with the assistance of every man in employment working harder than he had been accustomed to do in peace times, and with the recruitment of females into the labour market, and with the addition of those males who were unemployed, or did not work in peace times, it still left a gap to be filled of between 25 and 30 per cent. It was only by the exercise of private economies to that extent, that it seemed to him it would be possible to realize the ideal which he personally set up as being necessary if production was to be on such a level that at the close of the war they would be left with an amount not less great than that with which they entered the war. He again echoed his appreciation of the value of the Paper which Sir George Paish had read, and of the great privilege it had been to him to be asked to take part in the discussion.

Dr. J. C. Stamp joined in the tribute to Sir George Paish. The qualities they were used to associate with his name were not only, as the Chairman had said, those of lucidity and consecutiveness of thought, but also of great courage and comprehensiveness of view. He thought Sir George Paish must by this time be used to being told that he took a roseate view of things, and he thought he gloried in it secretly. But he (Dr. Stamp) agreed with every word that had fallen from the Chairman's lips with regard to one of the main items in the Paper, namely, the national income at the present time. The 3,000 millions of national income at the present time was made up of the old national income of 2,400 millions, plus 600 millions, being 300 millions wages, and 300 millions profits. The difficulty he had in following that was that he was not quite sure what Sir George Paish had in view in point of *time*. Was he comparing the rate at the present moment with the rate at the lowest point, May or July, 1914, when the boom was gradually subsiding ; or was he comparing a completed year, 1915, with a completed year, 1913 ? There was a vast difference between those comparisons ; because the shipping "extra" profits alone at present were probably at the rate of between two millions and three millions a week as compared with the profits at the time of which he was speaking before the war, when there were no extra profits compared with the average. This in itself would make an enormous difference. But if they took the year 1915 and compared it with the last *completed* year before the war, namely, 1913—he did not mind whether they took December, 1913, or March, 1914—he had great misgivings about the figure of 300 millions increase. It was true they had many mountain peaks which had suddenly risen to view owing to this upheaval, but there were also many deep valleys ; and when one set one against the other, on balance he thought there would be nothing like 300 millions to be found. He had a knowledge of many thousands of cases all through the country, and would like to be able to find an additional 300 millions. To March, 1915, containing about eight months of the war, on balance over the boom year of 1913 there was not very much net *additional* profit, except so far as new concerns called into existence by the war might have made a fair addition. But with the addition of shipping profits, the result of the year March, 1916, or December, 1915, was rather better ; and on balance, taking one industry with another, there might be some considerable amount in excess of pre-war figures. The difficult thing to gauge was the new industry. One could take a static sample of all industries on a wide scale, but that would not tell what was happening dynamically, as coming into the new profits sphere. So far as he knew, there was no evidence to justify the higher figure of 300 millions, unless it referred to the present *rate*, compared with the lowest *rate* before the war. Referring to the estimate of capital wealth, he said it was rather outside the scope of Sir George Paish's Paper to give the evidence that had satisfied him that the wealth was not less than 17,000 millions. They had had a large number of estimates flying about, varying from 8,000 millions, of Mr. W. R. Lawson, to 24,000 millions, of Sir Alfred Mond. There was plenty of room between those, and he felt with regard to those estimates that they were very much like Zeppelins—with a number of collapsible balloons keeping them up. When one balloon after another was pricked the Zeppelin got lower. He did not know whether Sir George Paish had got at that figure by capitalizing the boom years 1913 and 1914, or whether he had followed the Giffen method explicitly. As his book had already been referred to, he referred to it himself, for the reason that in the chapter on the subject he (Dr. Stamp) had devoted more space to that point than had been given to it since the time of Giffen, and perhaps more than he did. There were a considerable number of misconceptions in Giffen's treatment of the matter and many duplications of the figures. The estimate based on that principle had to be reduced. There was double valuation under Schedule A, and also such a thing, for instance, as stating the value of municipally owned trams, electricity, gasworks, waterworks, and so on, *separate* altogether from the profits Giffen had already capitalized, which had been going on ever since. "Income from abroad which had escaped taxation" was full of misconceptions. The capital belonging to non-income-tax-payers was a reduplication of much of the capital in the table above it. Then there was an important change in *content*. At the time he made his valuation the profits of public companies were about 40 millions, and of private businesses about 160 millions. But the private enterprise which now came under Schedule D and Public Companies were more nearly equal, and there was an important change in content in those figures, which made the application of a multiplier a much more difficult task than when he had applied it. There was also a general failure to deduct from the gross assessed profits such things as huge wear and tear allowances, and all the overcharges on estimated assessments. There was also an important fallacy in the application of the number of years' purchase which one derived from an ordinary conspectus in the money and stock markets to a profit which was exclusive of all profits from realty, separately dealt with, and inclusive of all reserves. There were a number of features in the estimate leading to the 17,000 millions which, in his judgment, needed considerable modification. The excess profit figures to which Sir George had referred were those given in the Budget speech as an estimated yield of the following year, namely, 37 millions. He would assume that at that time there were no excess shipping profits, or practically none, and that those alone would suffice to pull them up to a very large figure. That Budget speech referred to the financial year now just expiring and the following financial year. They were not annual figures. They referred to how much could be collected and assessed—how much could actually come in from all kinds of accounts and assessments, some of them very old, and some of them right up to date. So that in saying precisely what might fall into a given year, there was no indication of any annual rate, and one wanted to guard oneself in that way. Six millions was also mentioned in the Budget speech; when the Bill was brought in, there were many important things in it which were not contemplated in the Budget speech; for instance, the two best years out of three were given as the standard. There were other things which would affect the 37 millions—conditions of time for making returns and making payments made it physically impossible for anything like six millions to come into the current financial year, and it merely represented something to come in the following year. It showed how difficult it was to reason from an Exchequer receipt of that character to anything like the profits that might be expected to accrue from a *particular* year. He laid great stress upon the importance of definitely deciding when they were talking about any of these figures whether they related to a fixed year or with a rate at some particular moment, because the problem was like getting on to an express train—it changed at every moment. He thanked the Chairman for his words of warning, following the conclusion of Sir George Paish's Paper—that they should not be led away by too roseate views of their national wealth at a time when so large a portion of their profits were going round in a vicious circle. This was merely a money measure of the services that people were rendering. It was not always an addition or accretion of wealth when so large a part of the profits was being taken in taxation and being handed back to the same people and recalled profit. One had to be very careful for what one used the figure of 3,000 millions, or, as he preferred to put it, of 2,700 millions. One could not be too emphatic in one's warning. What M. de Foville had called "unhappy improvisations" of wealth made by the French economists were used by Bismarck against the French on the Evacuation of Paris. But fortunately this contingency was unlikely here, and nothing that Sir George Paish had said was likely to be used against us in the Evacuation of England.

Mr. PETHICK LAWRENCE said he would like to analyse the points of the exceedingly valuable and interesting Paper and of the discussion they had heard into two rather distinct lines, the economic and the financial. He did not think the rosy view of the Paper was in any way exaggerated as regarded the extraordinary economic success in which this country had passed through the last eighteen months. He thought it had been a perfectly astounding fact that they had been able to keep up the flow of production in spite of the large number of men being withdrawn into the fighting forces, and it was interesting to see how that had happened. In his opinion it had been produced by two things, or by one thing in two forms. A large number of men who had been employed on some inferior work before had shown that they had been capable of doing very much better work, and a large number of women had been able to be drawn into the economic machine and do exceedingly valuable and even skilled work. The result was that economically there had been achieved something which the economists thought was not at all possible before the war began. It was a question of how far that could be carried out in the future. When the war was over, and all the various people engaged on war work were set free, would it be possible for the country to take advantage of the greatly increased power and skill of labour that had been evolved during the war? He thought the question was a question of the relationship between the amount of capital they had at their disposal and the amount of labour. It certainly seemed that the amount of capital would not be greater than it was before the war, and would probably be less. He therefore thought it was very doubtful whether, in spite of the great efficiency which labour had shown during the war period, anything like the high figure of productive output would be able to be kept up after the war was over. Passing from the economic to the financial side of the matter, he thought they were faced with rather a different question. When they spoke of the great success with which they had raised the revenue, and the way in which the income had met the taxes which had been put upon it, they must be careful to understand the position. Supposing they had an income of 10,000*l.*, and they were called upon to pay a tax of 1,000*l.*, they were paying one-tenth of their income. Supposing by some artificial process they counted themselves as having an income of 11,000*l.*

instead of 10,000*l.*, they could obviously and with equal facility pay the 2,000*l.* of their income, and be exactly where they were before. He thought there was a little of that in the very large sum they had paid in revenue. The essential fact about it was, there had been increased profits, and they had taken part of them in taxation. Supposing instead of doing that they had taken some other means of preventing there being increased profits, the position then, being just as good, or perhaps better, would appear very much worse. If they had not paid enormous prices for munitions and shipping (which in many respects had been very injurious), then, instead of 3,000 millions, the income would have been down to something like 2,800 millions, and if at the same time instead of succeeding in raising 400 millions in taxes they had only raised about 200 millions the position would have appeared much less favourable. As a matter of fact, it would have been another form of doing the same thing. He, therefore, thought when they took a very rosy view of the financial position they must remember, as the Chairman had said, it was because they had been paying enormous prices and had been making these very high profits, which would only be maintained during the continuance of the war, and were not in any sense a measure of what could be done after the war was over. Mr. Rowson had said the question between loans and taxation at the time was, in his opinion, one of stimulating industry. The fact was that industry was stimulated enormously in any case. He thought they had stimulated industry as much as they possibly could, and it would be stimulated to an enormous extent even if they raised a large part of their money from taxes instead of by loans. It seemed to him the question of loans and taxes was one of distribution, and he felt very strongly in support of what Lord George Hamilton had said as to the situation after the war. The question of distribution was a fundamental one. If they took a large part of the money required for the war in the form of taxation, they were bound to place that taxation on the people who had the main part of the wealth of the country. They were familiar with figures showing that a large part of the wealth of the country was in a very small number of hands; and if they put taxes on, the great bulk of the burden was bound to fall on those people. But if they took it in the form of loans, then the wealthy classes by their savings were able to put by an immense amount of money in these loans, and the result would be in the future that the wealthy classes would have a lien on the future industry of the country; and when the war was over, the working classes, large numbers of whom had made very great sacrifices during the war, would find that the wealthy classes were not merely in as good a position as they were before the war, but in some respects very much better, because not only would they own all the wealth of the country as they did before the war, but they would also have that enormous lien (consisting of the national war debt) upon all the future wealth. He thought they would then be faced with a very serious position; and that was the principal reason why, for his part, he would like to see a still larger part of the war cost placed upon taxation, and very much less placed upon loans.

Mr. Percy Wallis called attention to what appeared to him to be a discrepancy. The rise in prices was quoted as 57 per cent., but the rise in prices shown by the increased income of the country was only 25 per cent.; 6 millions on 2,400 millions was 25 per cent. This corresponded with the fact that 4,000,000 men had been taken away from industry, which was 25 per cent., and they had 25 per cent. increase in prices, which might be taken to balance. But against that they had an increase in the number of persons employed of some 2½ millions, which was another factor which would reduce the percentage of increase in price shown by the total value. It seemed to him that the estimate of 57 per cent. rise in prices was a miscalculation. From his own information he had felt that the rise in prices was much nearer to 25 per cent., which was borne out by the figures of the increased value. This estimate was based on the fact that the whole of the prices, he believed, were determined by the cost, and the cost had been increased by the 4,000,000 who had been taken away from industry. He also expressed his belief that the figure of 3,000 millions which had been suggested was very likely correct. His own estimate had come to the same conclusion; but he took it that the 2,400 millions which had been suggested as the probable pre-war price was too high. They had to add to the pre-war price the extra amount produced by the 2½ millions which had been drawn into industry, and had not been there before. Added to that was the rise in prices, so that he arrived at about the 3,000 millions; but he believed that the original estimate of Mr. Flux for 1907 was on the high side, so that the increase caused by the war was larger than shown by the author of the Paper.

Mr. T. H. Haynes said the national income was the corner-stone of the Paper. The estimate for 1907 by Mr. Flux referred to on the first page was taken as the basis on which the extended estimates for later years had been compiled. Others more or less on the same lines, such as those published by Professor Bowley and Mr. Crammond and in the *Round Table*, were based also on the production in 1907, the only year in which figures were available to test the output. In all those estimates precautionary words occurred, either in the headings or in the context, to indicate that they represented aggregate income. The point of importance when they had to consider what taxation that income could bear was, to what extent those aggregate incomes were supported by tangible real wealth. He maintained that the real income of the country was the output of production, less exports, plus imports, less the amount of material imported consumed in the home output of production, and nothing more; on the other hand, aggregation meant duplication. Mr. Flux in his Census of Production reduced the total by 600 millions for duplication. But he put forward his estimate for the same year of "the total income of the United Kingdom" at a sum very much higher than the total of the goods then in existence. That output, plus the net imports, less the exports, came to 1,250 millions, and Mr. Flux's estimate of total income was from 1,900 millions to 2,150 millions, the items being headed specifically "goods consumed or "exchanged." In the *Round Table* this estimate was reproduced last December in abbreviated form and the word "exchanged" was omitted. "Exchange" meant duplication, and, in his opinion, it was not consistent that duplication should be revived in the income, though left out in the output. The compilers of those estimates, of course, realized that duplication existed, but the general public might not see that clearly. There was a very striking instance of it in the House recently when the sterling rate of exchange was tumbling to pieces, and they did not know for the moment exactly how to meet their liabilities in the United States. It had been announced that the public expenditure for the year was 1,550 millions, and the Chancellor of the Exchequer, being asked about the national income, said that statisticians of repute had put it at 2,200 millions to 2,400 millions. The Leader of the Labour Party immediately cried out "Then we have plenty to go on with"; but if he had thought for a moment that the real material basis was nearer 1,250 millions, liquid assets which the bankers would regard as serviceable for settlement of international debt, he would not have been so ready with that exclamation.

Mr. A. W. Flux, referring to the remarks of Mr. Haynes, pointed out that, in estimating the income of the country in goods, it was necessary to value the goods at the stage at which they passed into the hands of consumers, while the figures cited by Mr. Haynes appeared to refer to their value at the earliest stage at which they were found as completed goods, excluding the value of the services of distribution and transportation to consumers. In Sir George Paish's Paper the view was expressed that, measured by the quantity of things produced, the resources of the nation were now less than just before the war began. This naturally followed from taking out of the ranks of production the men who formed the fighting forces. The figure of 2,500,000 mentioned by Mr. Wallis as that of new producers brought in to replace those who had thus been withdrawn was, he thought, too high. With the admittedly reduced volume of production, he doubted whether the money value of the current output had been raised sufficiently to make the national income 3,000 millions, and would be disposed to accept a figure even less than the 2,700 millions suggested by Dr. Stamp. With reference to the figures from the *Labour Gazette* quoted in the Paper, he doubted whether they furnished satisfactory evidence for the conclusion drawn from them by Sir George Paish. Further, in estimating the national income, or the revenue on which we could draw for carrying on the war, the inclusion of the payments made to soldiers or their dependants appeared to him not to be justified. Such payments represented rather a portion of the material goods produced by the rest of the community which was handed over to those who fought their battles for them. To add it in as a part of our resources for warlike purposes seemed like counting it twice. For such purposes our resources were reduced by the necessity of taking so many men out of the ranks of the producers. The figure of 3,000 millions, or, rather, the figure which ought to be substituted for Sir George Paish's 3,000 millions, might be misleading if used to indicate the strength of the nation to carry on the war. It was an inflated expression in money of a reduced income in goods. The figure of 3,000 millions might be reached if inflation of prices continued, but he thought it would be a misfortune if, in that way, it were reached.

Sir GEORGE PAISH, in reply, said that they would not expect him at that late hour to refer in detail to all the comments. He wished, however, to refer to the matter that Lord George Hamilton had dealt with. The Chairman had said the income which he (Sir George Paish) was assuming, of 3,000 millions, was a very dangerous figure. He did not wish that any should imagine that that income would go on after the war was over; it was the current rate of income out of which the country's war expenses had to be paid and was due to the war. If for the sake of argument one were to assume that wages had not gone up, and that profits had not gone up, they would be up against a situation in which they had to find nearly 2,000 millions for the war and other Government purposes out of a total national income of 2,400 millions. It was obvious that such an expenditure could not be met out of such an income. But luckily that was not the situation. The situation was that the income of the country at the present time was 3,000 millions, and that after paying for the war they had, roughly speaking, 1,000 millions, or rather more, for the domestic part of the population not engaged in war work to live upon. Prices, wages and profits had risen, and if they had not risen the war would not cost so much. It was partly due to the great advance in prices that they would have to spend nearly 2,000 millions for Governmental purposes in the coming year. Excluding the influence of the rise in wages and the rise in profits, they had nearly, but not quite, the same production of food, clothing and other things as before the war. On the other hand, they had a very big increase in the production of munitions, and in spite of the great army that had now been recruited, the nation's aggregate production of things had probably increased. This was due in part to the fact that a large number of men recruited for the army had come from the domestic services, and that their enlistment did not reduce production; that large numbers of women had been obtained for productive services who were previously engaged in services that contributed very little to the productive power of the country; and that the whole nation worked harder and more efficiently. Then, beyond the greater amount of productive work that had been done, the rate of wages had appreciably risen, and the sums paid in wages—including the amounts paid to members of the army and navy—had greatly increased. When all these factors were brought into the account it was apparent that the wage income had increased by roughly 300 millions. As regards profits it was abundantly clear that an expansion of 300 millions was a reasonable estimate. It was evident that the profit of farmers had greatly increased. They all knew how wheat had gone up. The price of wheat was now nearly double its pre-war level, and all kinds of foodstuffs had gone up in price. Much bigger profits were also being made in the coal mines. It was true the wages had gone up, but the rise in prices more than took care of that. In the woollen trade they were making big profits, and in the steel trade and in other industries, with one or two exceptions, they were making additional profits. The shipping industry was particularly prosperous. When they came to examine the profits of the various trades of the country, they would find that 300 millions could easily be found, and, as far as one could see, the additional profits in the current year would be even greater. If they took shipping alone, this year, after allowing for higher wages and a substantial increase in other expenses the increase in profit would be immense. Having regard to the rise of about 800 or 900 per cent. in freight rates, it was obvious that instead of the country enjoying a gross income from shipping, as normally, of about 100 millions, it might easily have an income this year of 400 millions, of which the greater part would be profit. Although the present income of the country allowed the war expenses to be met—and he thought there was no doubt that they did allow the expenses to be met—it was obvious that every member of the community must be very economical and very efficient, in order that the nation's great expenditure might be provided for. He had been accused of optimism in regard to another matter, namely, the question of what would arise after the war, which was perhaps in the minds of some of those present, and he was very glad that Mr. Rowson shared his views as to the amount of capital they would have after the war was over. Mr. Rowson had said that they would leave off with about as much capital as they had when the war started. As far as the evidence went at present, it seemed to him that they were not down on capital account. As he had shown in his Paper, they were just about square on foreign trade account. They had called in a very large amount of capital from abroad; but against the capital they had called in, they had lent additional capital to their Allies and to neutral countries. Moreover, the effect of the great debt the country was now creating would merely be to transfer spending power from the whole community to the people who subscribed the loans. They all knew that the greater part of the new capital of the country came out of unearned incomes. People did not spend the whole of their incomes that came from interest and dividends. Before the war the quarterly periods for the payment of interest of nearly 5 millions on Consols was the time selected by promoters and others to bring out large numbers of new companies and to raise new loans. He asked them to imagine the amount of new capital that would be available after the war when instead of 5 millions of Consol dividends they might have quarterly nearly 50 millions of Government interest. Beyond that there would be a sinking fund for the redemption of our huge debt. It would be impossible to allow a debt of from 3,000 millions to 4,000 millions to be unredeemed. They must have a big sinking fund, and that sinking fund would be the contribution of the nation in its collective capacity to the capital of the country. When this country got through this war, the discipline and suffering of the war would—or should—make everyone extremely efficient. Moreover, they would probably not have the desire to spend money as they spent it before the war. Therefore they would be both efficient and economical. Economy and efficiency meant a bigger production, reduced consumption in proportion to production, and a greater accumulation of capital. Before the war they were saving money at the rate of about 400 millions a year, and during the war they were not saving this money, for the savings were going into Government loans and were being destroyed by the war. This failure to save was a very big loss. Moreover, nearly the whole of the world's savings were being destroyed by the war, and the effect of that must be felt on the world's production for many years. Nevertheless, the losses by war would make them efficient, and by reason of their efficiency they would create new wealth, and in a comparatively short time would completely recover from the effect of the war.

A vote of thanks was put to the meeting and carried unanimously.

The following candidates were elected Fellows of the Society:—

William Carruthers.
H. Epton Chapman.
Thomas Fitzpatrick.
L. E. Lupton.
Myer M. Orensteen.
J. Allen Taylor.

COST OF FOOD FOR AN ADULT WOMAN.

By MISS C. E. COLLET, M.A.

[Read before the Royal Statistical Society, April 18, 1916, Sir JERVOISE A. BAINES, C.S.I., Hon. Vice-President, in the Chair.]

THE following analysis of cost of food for adult occupied women was made in the Board of Trade in 1912, in order to discover the difference between the expenditure of wage-earners whose food consumption was limited by income, and that of women who without asceticism limited their expenditure to the standard necessary for efficiency.

From the table given below it would appear that, in that year, 5*s.* a week was the very lowest cost per head even in households with a good housekeeper able to buy at wholesale prices, and catering for a community with very limited incomes.

On the other hand, a cost of 9*s.* 6*d.* per head evidently represented all that was necessary for efficiency.

In no case was the cost of preparing the food (in the form of wages to servants or meals purchased at restaurants) included.

At the present time the analysis has a special value as indicating a line of demarcation between necessary and unnecessary expenditure. A study of the columns showing the items of food consumed by the wage-earning women suggests that (with the exception of one item in one case) an increase rather than a decrease should be advised as necessary for efficiency, and that taking 5*s.* 6*d.* as the minimum necessary in 1912 no reduction in consumption should be made in 1916, although the consequent food cost would have risen to about 8*s.* 3*d.* To women wage-earners spending less than this sum on food (apart from its cost of preparation) no appeal to diminish consumption should be addressed. And it is doubtful whether more than one-tenth of the adult female population are spending above this sum at the present time. But in this time of stress the other workers represented in the table could have denied themselves, not merely the 2 lbs. of meat per month (say, 1 ounce per day) which was stated to be the amount of the average economy per head of the entire population required to adjust demand to supply nearly a year ago, but considerably more than this, replacing it by extra lentils, cheese, &c.,

and reduced their 9*s.* 6*d.* bill of fare to 8*s.* 6*d.* (at 1912 prices), without serious injury for the time being. Such a (reduced) bill of fare would amount to about 12*s.* 9*d.* in 1916.

As a guide to richer women, anxious to economize for the sake of the State, these returns suggest that an expenditure of over 13*s.* a week for an adult woman's food is not necessary for efficiency at the present time.

The table presents the expenditure on food for four weeks in 1912 of :—

1. A London settlement providing breakfast, lunch, tea and dinner for 22 women residents.
2. A family of seven women living in London.
3. A family of four women living in the country.
4. Three homes for young women in business in London.

One of these homes catered for an average of 32 women receiving breakfast, and either dinner or supper ; the accounts do not include expenditure on lunch or tea of those away the whole day ; those having dinner in the middle of the day at the home did not have supper. The second catered for an average of 27 women receiving breakfast, dinner and tea or milk ; the third for 23 women all receiving breakfast, dinner, tea and supper.

The accounts of these households have been brought into line with those of certain wage-earning women given in the Board of Trade "Accounts of Expenditure of Wage-Earning Women and Girls" (Cd. 5963 of 1911).

The settlement provided a solid lunch for an average of three visitors a day, an equivalent of one visitor a week per head, besides light tea for an uncounted number of callers.

Family A rather more than balanced expenditure on visitors by absence of its members on visits.

Family B incurred a small expenditure on visitors.

All six households included someone who was especially in charge of the housekeeping. In no case did the wage-earning women, whose accounts have been extracted from the Board of Trade volume, have anyone at home in charge of housekeeping.

Average cost of food per head per week in households of adult women (in all of which someone was specially in charge of housekeeping) calculated in accounts for 28 *days in* 1912.

	Settlement, London. 22 women, 4 meals a day.	Family A, London. 7 women. 4 meals a day.	Family B, Country. All meals.	Homes for young women in business in London.		
				No. 1. 32 women, breakfast and dinner, or supper.	No. 2. 27 women, breakfast, dinner and tea, or milk.	No. 3. 23 women, 4 meals a day.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Bread	0 5½	0 4½	0 5¼	0 4	0 4¼	0 5½
Flour	0 2¼	0 0½		0 1	0 1	0 1
Cake, biscuits, &c.	0 2	0 2½	*	0 0½	0 0½	0 0¼
Baking powder	*	0 0¼	*	—	0 0¼	—
Oatmeal	—	—	—	—	0 0¼	—
Rice, &c.	*	0 0½	*	0 0¼	0 0¼	0 0½
Fish	0 5½	0 7¼	0 7	0 1¼	0 4	0 1½
Butcher's meat	2 5¼	2 8	1 9½	0 10¾	0 8½	0 11½
Bacon, ham, &c.	0 6¾	0 5		0 3¼	0 4¼	0 4¾
Lard, suet, &c.	0 0¼	0 0½		—	0 0½	0 0½
Poultry, &c.	0 1½	0 1¾		—	—	—
Eggs	0 5¼	0 8	0 6	0 2	0 1½	0 2¾
Milk	1 1¾	0 9	1 10	0 5	0 9½	0 7
Butter	0 10¼	0 7½		0 5¾	0 8½	0 8½
Margarine	—	—	—	—	0 0½	—
Cheese	0 1¼	0 1½	*	0 0¼	0 0½	0 0¾
Potatoes	0 3¼	0 2½	1 5¾	0 1¼	0 1	0 1¾
Other vegetables	0 5¾	0 6½		0 2¼	0 1¾	0 2
Fruit (fresh)	0 3¼	0 8¼		0 1¾	0 0½	0 1
,, (dried)....	*	0 2¼		—	0 0½	0 0½
Tea	0 4¾	0 1¾	0 7¾	0 1½	0 2¼	0 2
Coffee		0 1¼		—	0 0½	0 0¼
Cocoa	*	0 0½	*	—	—	0 0¾
Sugar....	*	0 1¼	*	0 0¾	0 1½	0 2
Jam, preserves	0 9	0 1¾	*	—	0 2	0 4¼
Condiments	*	0 1	*	0 0¼	—	0 0½
Miscellaneous (including items marked *)	1 1¼	0 0¼	2 8½	0 0¼	—	0 0¼
Total per week	10 2¾†	9 0	9 11¾‡	3 6§	4 6¼‖	4 11¾

* Miscellaneous.

† Includes proportion of cost of three visitors a day to a solid lunch.

‡ Includes proportion of cost of occasional visitors.

§ Does not include lunch or tea of those away all day, or supper of those dining at mid-day.

‖ Does not include a solid tea or supper.

Average cost of food per head per week of adult wage-earning women in 1911 (having no one at home in charge of housekeeping).

[From "Accounts of Expenditure of Working Women and Girls."—Cd-5963.]

	Reference No. 39. 1 woman.	Reference No. 85. 1 woman.	Reference No. 18. 2 women.	Reference No. 16. 3 women.	Reference No. 64. 3 women.	Reference No. 81. 2 women.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Bread	0 5	0 6	0 8¾	1 1¾	0 9¼	0 5½
Flour		0 0¼	0 2		0 0½	0 1¼
Cake, biscuits, &c.	0 3¾	0 1¼	0 1¼		0 0½	0 0¼
Baking powder	—	—	0 0½		—	
Oatmeal	—	—	—		—	—
Rice, &c.	0 0¼	0 0¼	0 0¼		0 0¼	0 0¼
Fish	0 2¼	0 3¾	0 1¼	—	0 2¼	0 3¾
Butcher's meat	1 0	1 6¾	1 0½	2 1	0 5¾	1 3¼
Bacon, ham, &c.	0 5	0 6	0 2¼		0 1¼	0 0¾
Lard, suet, &c	—	0 0¼	0 1¾	—	0 1	0 0½
Poultry, &c.	—	—	0 2½	—	0 0¾	0 0¼
Eggs	0 2¾	0 5¾	0 0¾	0 2½	0 3	0 0½
Milk	0 0¼	0 4	0 3	0 6½	0 3¾	0 3½
Butter	0 6½	0 7¼	0 10½	0 9¼	0 6	0 1¾
Margarine	—	—	—	—	—	—
Cheese	0 0¼	0 3	0 1¼	—	0 2	0 0¼
Potatoes	0 6	0 2	0 0½	0 5¼	0 1½	0 1¼
Other vegetables		0 1	0 3¼		0 1	0 2¾
Fruit (fresh)	0 2¾	0 0¾	0 2¼	0 1½	0 2¼	0 0½
,, (dried)	—	—	0 1½	—	0 0½	—
Tea	0 3½	0 4	0 3½	0 2¾	0 3	0 2¾
Coffee	0 1¼	—	0 0½	—	0 0¼	—
Cocoa	—	0 0¼	0 1	—	0 0½	—
Sugar....	0 3½	0 2¼	0 4½	0 1¾	0 1½	0 0¾
Jam, preserves	0 4¼	—	0 1¼	0 2¼	0 1¾	0 0¼
Condiments	0 0½	0 0¼	0 1¼	—	0 0¼	0 0½
Miscellaneous	0 0½	—	0 5¼ (Beer)	0 1	—	0 0¼
Total per week	5 0¼	5 7	6 1¼	5 11½	4 0¾	3 6¾

DISCUSSION ON MISS COLLET'S PAPER.

CAPTAIN M. GREENWOOD, in proposing a vote of thanks to the author, said that the importance of such inquiries as those of Miss Collet, particularly at the present time, was obvious. He hoped that Miss Collet would be able to supplement the information contained in her Paper because certain additional particulars should, in his opinion, be furnished before any definite conclusions were drawn. It was not clear what criterion of "efficiency" had been adopted by the author. An efficient diet was, he thought, one which maintained the subject's nutritional equilibrium; the most important test being that there should be no loss of nitrogen. It was well known that a diet efficient for one person might be quite unsuitable for another, and that, for any one person, the diet should depend on the amount and nature of the work performed. What was suitable for a family of women living in the country might be very unsuitable for women residing in London, and an adequate dietary for brain workers might be quite insufficient for hand workers. He did not think that sound conclusions could be deduced from a study of budgets alone, since, apart from the considerations just noticed, differences in methods of marketing and in skill in the preparation and distribution of food were important factors. The substitution for some article of food of another calculated to yield the same numbers of energy, heat or protein units (*e.g.*, lentils and cheese for meat) was not always followed by satisfactory results, and he was strongly of opinion that any such proposals should be controlled by careful observations made in accordance with the principles and employing the methods of physiological research. He hoped Miss Collet would give the Society some further information on these points, and he begged to move a hearty vote of thanks to her for the Paper she had just read.

Mrs. WOOD, in seconding the vote of thanks, said that Miss Collet had given in her Paper a number of food budgets for the middle class, and that these were among the very few published which referred to this class. Miss Collet had also shown a number of food budgets for working class women. If the two sets of budgets were compared it was clear that the proportion of the total expenditure on food which went on the various commodities was very different in the two cases. The most striking instance was that of bread. The total weekly outlay per head for four meals a day varied from 3*s.* 6¾*d.* to 10*s.* 2¾*d.* The actual amount spent on bread varied from 4½*d.* to 9¼*d.*; but instead of the larger expenditure on bread being found where the total outlay was greatest, the reverse was almost the case. For instance, the woman spending 4*s.* 0¾*d.* per week on food, spent 9¼*d.* on bread, while the smallest expenditure on bread, viz., 4½*d.*

per week—was in the case of a family with a total expenditure per head of 9*s.* a week. It was often said that the poorest spent relatively much more on bread than people who were better off; and Miss Collet's tables not only confirmed this but also suggested that their actual expenditure on bread might often be greater than that of the more wealthy. Another striking thing was the almost total absence of margarine in the budgets. In only one case did margarine figure at all, and then only ½*d.* per week was spent on it. Mrs. Wood then went on to ask Miss Collet what grounds she had for assuming a 50 per cent. increase since 1912 both in the case of the person spending 5*s.* 6*d.* per week on food (taken as the minimum required to feed an adult woman in 1912), and of the person spending 8*s.* 6*d.* per week (taken as the maximum required in 1912). Individual articles of food had increased in cost to a very different extent, and such an assumption required some justification. For instance, potatoes were, if anything, cheaper than before the war, sugar had more than doubled in price, bread was 50 per cent. dearer, and so on. The increase in the total cost of food would depend naturally upon the relative amounts spent on the various commodities, and as the relative amounts spent on the various commodities differed according to the scale of expenditure on food as a whole, it did not seem safe, on the face of it, to assume a similar increase in all cases. Perhaps Miss Collet would explain, in her reply, what data she had for arriving at the percentage increase since 1912 which she had used.

Mr. PETHICK LAWRENCE asked Miss Collet whether she could give any further information as to the extent to which women of the working classes were living below the standard minimum which she indicated. He noticed that she suggested that not more than one-tenth of the adult women of the country were living above it; he would be glad if she would elaborate some of the considerations which led her to make this estimate. He had heard it said that many a working man's wife, after providing for her husband and her children, had only a few pence a day for her own food. Would Miss Collet agree with this statement? If it were true, it represented a very serious state of affairs.

Dr. J. C. DUNLOP spoke in support of the contention raised by Dr. Greenwood, holding that the mere test of cost is insufficient to determine the efficiency of a dietary. He explained how it was necessary to know what was bought as well as what was paid, and to know how much nutriment was being provided before a diet was considered efficient. By nutriment he meant the energy value and the proteid value of the food. Dr. Dunlop agreed with Miss Collet in her general conclusion that those who are spending most on food are those who can best afford to economize, but took exception to her use of 8*s.* 6*d.*—or 12*s.* 9*d.* in war time—as a standard above which economy could reasonably be expected and below which that was not the case, it being essential to know the nutritive value of the diets obtainable before any such standard is justifiable.

Mr. SYDNEY YOUNG said he rose simply to emphasize the importance of the weight of the goods being added to the price in the tables given as mentioned by Mrs. Wood. Without that one cannot conveniently compare the various items as the difference in the price of goods supplied being largely controlled by the quantity purchased at any one time.

Dr. SOPHIA JEVONS said the following figures represented the cost of living for officers in the industrial schools of which she was a manager administered by the London County Council. The first was a girls' schools with seven female officers, whose food was kept quite apart from that of the children. The maximum allowance in pre-war times was 8*s.* 3*d.* per week, and they were able to live well on a sum per head per week well under the maximum. The second was a boys' school with a mixed staff, where the maximum allowance was 8*s.* 9*d.* per head per week. Here also the children's food was kept apart, and the staff were able to live at or just under their maximum. In both cases the staff had the very real advantage of being able to buy at contract prices.

Mr. ERNEST AVES said that two figures of considerable interest had been mentioned by the last speaker, 3*s.* for children and 8*s.* 9*d.* for adults. He was not quite clear whether the second as well as the first was a pre-war figure.

Miss BRUCE, the Warden of Cheltenham Ladies' College Settlement, Bethnal Green, said that she had been accustomed to a household of twenty-two, and that her average expenditure on food before the war was 8*s.* 2*d.* per head per week.

Dr. J. C. STAMP said that what little experience he had had was from the other point of view, namely, that employers who have large establishments and a lot of employees "living in," claimed as their expenses (for the purpose of taxation) figures which were rather *higher*, it need hardly be said, than those given. Immediately before the war many drapers had reckoned from 8*s.* 6*d.* to even 12*s.* 6*d.* Probably they treated their employees very much better than the employees think they do! One could lay too much stress upon the physiological aspect of these statistics, reducing them to units, calories proteins, and so on, because it was quite possible to get a perfect dietary made up of these units which no one would eat! A dietary might be far more strength-producing and far more invigorating, even if it had just a slightly less percentage of the truly chemical products than the physiologist would allow. He imagined the best test, and almost as good a test as the physiological test would put them under, unless there was some extremely analytical process, was the test put by the lady who spoke with regard to efficiency. That was the test of general good health. Even if one could apply the physiological test of efficiency by making them punch a machine with some particular accuracy attaching to it, or doing weight lifting or something which would test their powers of endurance on precisely the same lines, the *personal* element in that matter was so widely different, that after all it would not be a very much better test than to keep people in decent health to do the work ordinarily required of them. He thought they might, therefore, assume that these practical figures given in the Paper were with regard to women fed at those particular rates who were not in a state of decline, getting weaker and weaker, but who saw to it themselves that they spent enough to keep themselves in health. The amount spent on the delectable items which were given was far more likely to get "efficiency" than if they were tied down to a schedule which was physiologically exact.

Miss Collet, in reply, said she wished especially to express gratitude to the last speaker. The question of nourishment was, of course, exceedingly important for those people who were giving advice to housekeepers. She was not competent to give it, and did not attempt to do so. The accounts had not been collected with reference to the war; but had been done out of curiosity to know what people really did spend when they spent as much as they felt they wanted. She was glad to notice that Miss Bruce's pre-war dietary was very close to her reduced maximum dietary. Miss Bruce's was 8*s.* 2*d.* and hers was 8*s.* 6*d.*[1] She thought she had answered one part of Dr. Greenwood's question, but he seemed to think that she was taking 5*s.* 6*d.* as really representing a pre-war efficiency standard. She was not. She was taking it that at any rate they could not spend less than 5*s.* 6*d.* for efficiency. Looking through the accounts of all the people who spent less than 5*s.* 6*d.* or 6*s.*, one could see quite clearly that they were not spending enough. Putting aside the question of efficiency, she thought the standard of health generally for women was far too low. She would herself criticize these figures by saying that she would like to know what was the average sickness during a year of people on these lower diets. That was a fact she was not able to collect. With regard to the homes for young women in business, she thought there was no doubt whatever that none of them were eating as much as they would if they had enough money to pay for more food. Mr. Pethick Lawrence had referred to her guess about probably only one-tenth of the adult women population spending more than 8*s.* 3*d.* at the present time. Roughly speaking, only about 10 per cent. of the population were waited upon by servants, and of these ten at least five were waited on by one servant only. Even in the servant-keeping classes, one knew that under-feeding was common with regard to the wife, and also, to a certain extent, the servants. Whenever the husband or the son was away, it was a common thing for the housekeeper to suspend all solid meals, and the daughters suffered accordingly. She thought they would find the general feeling was that if only the women of the family were at home, it was not worth cooking a dinner for them. She had never seen a working-class family budget which gave room for a greater expenditure for the women than the 5*s.* 6*d.* pre-war allowance. She thought that very frequently the mothers went without anything resembling what was required for efficiency. With regard to Dr. Dunlop's criticisms, it was exceedingly important that the questions of values of foods should be worked out by the right people ; but she thought it was also important to know on what and how the ordinary human woman, who did not do these things scientifically but bought what she could get for the money she had, did spend it.

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[1] It should be noted that my figures refer to a statistical week not a housekeeper's week. Thus anyone absent for a week-end from Saturday afternoon to Monday morning has been counted as receiving food for $\frac{18}{21}$ of a week.—C.E.C.

The CHAIRMAN (Sir J. A. BAINES), in putting the vote of thanks to the meeting, said he was afraid when Captain Greenwood began his remarks that the Paper might be considered a little narrow in its field, and would not lead to a good discussion. But he had been agreeably surprised, as the discussion had shown the wide field which the Paper laid open, and the number of inquiries which were required to lead to conclusions on either of the main aspects in which the subject had to be regarded.

A vote of thanks was passed to the author, Miss Collet.

NOTE AS TO ERROR OF STATEMENT OF AGES OF YOUNG CHILDREN IN A CENSUS.

By JAMES CRAUFURD DUNLOP, M.D., F.R.C.P. Edinburgh,
Superintendent of the Statistical Department of the Registrar-General for Scotland.

[Read before the Royal Statistical Society, April 18, 1916,
Sir JERVOISE A. BAINES, C.S.I., Hon. Vice-President, in the Chair.]

ON December 15, 1914, I had the honour to bring before this Society a note as to errors of statement as to the duration of marriage in censal returns, and in the discussion which followed, Mr. Welton suggested the advisability of employing the method I used in testing the accuracy of the reporting the duration of marriage to test the accuracy with which children's ages are recorded in these returns, and the research which I now record is the outcome of that suggestion.

I have limited this study to children of less than five years of age, and, as a comprehensive sample of all such children, I selected those enumerated at the Census in the Registration District of Paisley, and in the County of Haddington. These two areas were selected, not for any observed peculiarity of population in them, but solely because of their population being of suitable dimensions. Paisley Registration District is a large and populous one; it contains the whole of the Town of Paisley, a considerable landward population, and, at the time of the Census, a small portion of the City of Glasgow. Its entire population at the Census was 91,038, of which 84,492 was burghal, and 6,546 extraburghal. The censal population of the County of Haddington was 43,254, of which 20,301 was burghal and 22,953 extraburghal.

The correctness of statement of age of the young children in these areas was checked by reference to the birth registers. It was accomplished thus:—All entries of children of under 5 in the enumeration books of those areas were transcribed on slips, as were also all entries in the Birth Registers covering a period of five years, and that is of all children born in these areas between April 2, 1906, and April 2, 1911. On the slips recording the censal statement of age that age was recorded, and on the slips taken from the Birth Registers the day of birth was recorded; in addition and wherever available the names of the parents and the father's occupation was also recorded on both series of slips. When a child was not enumerated in the parents' house, the name of the householder, and the relationship of the child to him or her, was noted. When the transcription of the slips was complete, each set was put into alphabetic order, the two sets compared, and when recognition was established, the age found on the Census slip was recorded on the Birth Register slip. After that, by sorting and counting, tables showing date of birth and reported age were prepared. Doubtful recognitions were discarded, and only those which were reasonably sure were included in the tabulation. The slips taken from the Paisley Census and Registers were examined separately from those taken from the Haddington Census and Registers.

The tabulation from the slips was made by the actual date of birth, each line representing a single day, but it was so bulky that I have thought it sufficient to reproduce it in a condensed form, using the month of birth, instead of the day of birth, as the unit.

The total number of slips prepared, examined and counted was 31,893, of which 12,025 were taken from the Paisley Registers, 9,714 from the Paisley Census, 5,468 from the Haddington Registers, and 4,686 from the Haddington Census. Of the 9,714 children named on the Paisley Census slips, 8,177 were identified in the Birth Register slips, and of 4,686 recorded on the Haddington Census slips, 3,804 were similarly recognized. In the case of Paisley, the recognitions amounted to 84·2 per cent. of the total, and in the case of Haddington to 81·2 per cent. The total number of children included in the census of books of Paisley and of Haddington and whose dates of birth were in this way ascertained was 11,981.

The method was not equally successful at each of the younger ages, for it was found that the percentage recognized on the Birth Register slips—*i.e.*, whose date of birth was ascertained—was highest among infants of less than one year old, and decreased with each advancing year of age. Figures showing this point are collected in Table B and it may there be seen that while fully 90 per cent. of the children of less than one year old named in the census were successfully traced to the Birth registered, the corresponding percentage in the case of children of more than four but less than five years old was slightly under 78. The proportion of children of less than one unrecognized in the Birth Register slips was 9·3 per cent.; of those of more than one but less than two, 14·6 per cent.; of more than two but less than three, 17·6 per cent.; of more than three but less than four, 20·8 per cent., and of more than four but less than five, 22·1 per cent. From this, it follows that the age distribution of the children whose ages were thus ascertained is not typical of the age distribution of young children in the general population, as the children whose ages were verified are relatively more numerous in the younger ages, and relatively less numerous in older ages, than is the case in the general population. Of the 11,981 traced from the Census to the Birth Registers, 2,646, or 22·08 per cent., were less than one year old, while 2,101, or 17·54 per cent., were more than four but less than five years old, but from this it is not safe to infer that children of those ages amount to 22·08 per cent. and 17·54 per cent. respectively in the general population, the probability being that children of under one constitute a percentage smaller than 22·08, and those of over four a percentage greater than 17·54, of children of under five.

The method appears simple and straightforward, and I anticipated little difficulty in its application, but in that I was to some extent disappointed, for in frequent instances there was ground for considerable and reasonable doubt. This arose through several causes. One frequent source of doubt was the use of fancy or pet names in the Census. In the Birth Registers, where the entries are made under the supervision of the registrar, the names of the children were properly recorded, but in the Census this was not always so. For instance, Elizabeths were frequently called Lizzie; Roberts, Bobbie; Catherines, Kate; and Margarets, Peggie. Such changes as these—and there were many others—interfered with the proper alphabetical order, and were the cause of some difficulty and confusion, and perhaps of some error mostly in the direction of non-recognition.

Not only did the use of pet names in many cases interfere with the recognition of the child, but it also did so in the recognition of the parents, for it was frequently found that the parents were described in the Census by Christian names different to those appearing in the Birth Registers.

A similar source of error occurred in connection with the description of the fathers' occupation—men describing themselves differently when entering births in the registers and when filling up census schedules. At one stage of the investigation, I made some endeavour to investigate this point, and to find out what proportion of men described themselves similarly in the two records, what proportion did not do so, and if possible to prepare some general statement about it, but I found such double description to be so frequent, and the varieties of it so numerous, that the task would be extremely heavy, and I had to relinquish the attempt.

One class of children in which this recognition was difficult was composed of illegitimate children, for these frequently, probably in the majority of cases, were not enumerated along with both parents, but were enumerated in the houses of grandparents, or in those of persons of no near relationship. In the latter case these children were generally described in the Census returns as boarders. However, the mere fact that the child was recorded in a Birth Register as illegitimate and was enumerated either as a grandchild or as a boarder of a householder proved in itself to be evidence which helped recognition. I have kept no special note of the relative frequency of recognition among legitimate and illegitimate children, but I feel safe in asserting that in the case of the latter it was less than in the case of the former.

Two other sources of possible error are worthy of comment, the one being faulty transcription, and the other possible confusion of months with years in the case of children of less than one year old, the ages of such children being recorded at the Census in months while those of elder children being recorded in years. Errors from these causes were not numerous. In a considerable number of instances I suspected transcription errors on the slips and referred back to the original entries in the Birth Registers and Census books, but rarely found the slips wrong. The small number of errors which might be ascribed to confusing months and years is made evident by a scrutiny of Table D, for it can there be seen that out of 233 children of one month old only 5 were described as one year old, out of 225 children of two months old, only 3 were described as two years old, out of 249 children of three months old, only 1 was described as three years old, and out of 224 children of four months old, only 1 was described as four years old. In all, only 10 possible instances of such error were found among 931 children of from one to four months old.

It was the existence of these sources of difficulty and error in recognition which made me decide to reject rather than include cases in which there was any doubt, feeling that it was better to have a smaller sample of good recognitions than a larger and less perfect sample.

Before stating the results of the study, let me briefly describe what is the most evident indication of error in the reported ages of children in censal returns. It consists of an almost constant—constant when large populations are dealt with—excess of children stated to be two years old over that of children stated to be one year old. Such excess may be seen in Table C, which states the numbers of children of ages under five recorded at the last two censuses in England and Wales, and in Scotland, and at the last Census of the Cities of Edinburgh and Glasgow. In each of these six instances, and they are not exceptional, children of more than one, but less than two were less numerous than those of over two but less than three, or of over three but less than four.

A general analysis of the results of the study is shown in tables and from them the following conclusions may be drawn :—

(1) That there is a considerable amount of mis-statement of age in the case of young children. The ages of 11,981 children were tested by reference to the Birth Registers, and in 11,083, or 92·5 per cent., the age stated in the Census was found to be correct, while in 898, or 7·5 per cent., it was found to be incorrect.

(2) Errors of statement of age are more frequently errors of overstatement than of understatement. Of the 898 incorrectly reported ages, 789 were erroneous because overstated, and 109 because understated. In the majority of instances, the error did not exceed one year. In only 47 of the 898 instances were the errors more than one year. In 770 the age was overstated by one year ; in 81 understated by one year, in 19, overstated by more than one year ; and in 28, understated by more than one year.

(3) Errors of understatement are more frequent in the younger months of each year of age, and those of overstatement in the older months. An inspection of Table D makes this quite evident. This study includes 707 children of less than 3 months old, and the ages of only 12, or 1·7 per cent., of them, are found to be overstated, while of 769 children of more than 9 but less than 12 months old, the ages of 100, or 13·0 per cent. were overstated. Similarly the ages of only 1·1 per cent. of children of over 12 but under 15 months old are overstated, while those of 24·3 per cent., of children of over 21 but under 24 months old were so overstated. Of children of 2 to $2\frac{1}{4}$ years old the ages of 2·0 per cent., and those of 3 to $3\frac{1}{4}$ years old, 0·9 per cent. were found to be overstated, while these percentages in the case of children $2\frac{3}{4}$ to 3, and $3\frac{3}{4}$ to 4, were 21·6 and 18·6 respectively. The percentage of understatement of age among children aged 1 to $1\frac{1}{4}$, 2 to $2\frac{1}{4}$ and 3 to $3\frac{1}{4}$ were 0·7, 1·7 and 2·2, while those of children of $1\frac{3}{4}$ to 2, $2\frac{3}{4}$ to 3, and $3\frac{3}{4}$ to 4, were 0·4, 0·1 and 1·0.

(4) Children reported at the Census as under one year old numbered 2,646. This included 20 children whose ages were ascertained to be more than one year, but excluded 154 whose ages while being under one were reported as over one. The 11,981 children contained 2,780 whose true age was under one year, and thus the Census number is found to be 134, or 4·82 per cent., too small.

(5) Children reported as being more than one, but less than two years old numbered 2,473. This included 142 children whose true ages were less than one year, and 27 whose true ages were more than

two, but excluded 244 whose true ages were more than one. Of the 11,981 children, 2,548 were in fact of this age, and as only 2,473 were so reported, there is a shortage of 75, or 2·94 per cent.

(6) Children reported in the Census as being more than two but less than three numbered 2,444. They included 236 who had not attained the age of two, and 32 who were more than three, but excluded 251 who though otherwise reported were of this age. Of the 11,981 children included in the study, 2,427 were of this age, and the reported number being 2,444, there was an excess of 17, or 0·70 per cent.

(7) Children reported as more than three but less than four years old numbered 2,317. This figure includes 236 children of less than three, and 30 of more than four, but excludes 205 of this age. Of the 11,981 children the number whose true age was more than three but less than four was 2,256, and the reported number being 2,317, there was an excess of 61, or 2·70 per cent.

(8) Children reported to be more than four but less than five numbered 2,101. This includes 175 whose true age was less than four, but excludes 44 who, while being of this age, were reported as being of younger age. The study being limited by age five, the returns do not show either how many children of more than five years old were reported at the Census as five years old, or how many children of this age were erroneously reported as of older age. Of the 11,981 children, 1,970 were in fact of this age, and the reported number is 131, or 8·65 per cent., in excess. The absence of information regarding the children reported as being over five detracts from the utility of this comparison, because a considerable number of children of this age would be reported as over five, and their inclusion in the study would no doubt have largely balanced this excess.

(9) Putting the foregoing together, and excluding reference to age four to five, the position may be summarized thus :—The number of children of less than one year old is too small by 134, or 4·8 per cent. ; and that of children of more than one but less than two by 75, or 2·9 per cent. ; while that of children of more than two but less than three is too large by 17, or 0·7 per cent. ; and that of children of more than three but less than four by 61, or 2·70 per cent. Or using rounder numbers, it may be stated that the number of children found in a Census to be less than one year old is too small by approximately 5 per cent., and the number of more than one but less than two years old to be too small by approximately 3 per cent., while the reported number of children of more than two but less than three is approximately correct.

The foregoing conclusions are in agreement with what is generally found in censal reports. In these reports the deficit of children of less than one year old is not evident for the reason that under ordinary circumstances there is a very considerably larger number of children of under one than of over one but under two, and such excess is sufficiently large to mask the deficit due to the error of overstated age, but with children of one year old this is not so, for the excess of them over those of two years of age is not sufficient to mask the deficit due to this error, and the consequence is the conspicuous deficit of one year old children in those reports.

Unfortunately the limitation of this study to children of under five prevents my suggesting any method of adjustment of censal figures to correct for erroneous statement of age. That there should be a transfer from the numbers from those reported as aged one to the number of those reported as aged less than one is obvious, and a similar though smaller transfer from the number reported as aged two to that aged one, but the limit of the study prevents any opinion as to how such an adjustment of figures should be compensated. The figure for age two is probably nearly correct and deduction should not be made from it, and consequently it would be from older ages that the deduction would fall to be made, but from which is not shown.

TABLE A.—*Showing numbers of children whose ages were tested by reference to Birth Registers.*

		Ages as stated in Census Returns.					
		0.	1.	2.	3.	4.	0–4.
Ages as found by reference to Birth Registers.	0	2,626	142	7	3	2	2,780
	1	13	2,304	229	2	0	2,548
	2	2	13	2,176	231	5	2,427
	3	4	8	25	2,051	168	2,256
	4	1	6	7	30	1,926	1,970
	0–4	2,646	2,473	2,444	2,317	2,101	11,981
Not traced in Birth Registers		270	422	523	608	596	2,419
Total traced and untraced		2,916	2,895	2,967	2,925	2,697	14,400

TABLE B.—*Number of children recorded in Census and traced to Birth Registers.*

Stated age.	Recorded in Census.	Traced in Birth Registers.	Not traced in Birth Registers.	Percentage traced.	Percentage untraced.
0–1	2,916	2,646	270	90·7	9·3
1–2	2,895	2,473	422	85·4	14·6
2–3	2,967	2,444	523	82·4	17·6
3–4	2,925	2,317	608	79·2	20·8
4–5	2,697	2,101	596	77·9	22·1
0–5	14,400	11,981	2,419	83·2	16·8

TABLE C.—*Numbers of young children enumerated in England and Wales and in Scotland at the Censuses of* 1901 *and* 1911.

Age.	England and Wales.		Scotland.		Edinburgh.	Glasgow.
	1901.	1911.	1901.	1911.	1911.	1911.
0–1	796,807	781,728	114,685	108,381	5,804	18,449
1–2	727,795	742,818	104,573	103,218	5,691	17,258
2–3	735,410	789,295	106,112	109,503	5,945	18,113
3–4	730,127	777,351	104,634	107,016	5,809	17,629
4–5	726,569	763,191	103,029	104,627	5,763	16,696
0–5	3,716,708	3,854,383	533,033	532,745	29,012	88,145

TABLE D.—*General Analysis showing true and stated ages of* 11,981 *children.*

True age in months.	Stated age—Census—in years.				
	0.	1.	2.	3.	4.
0	248	1	—	—	—
1	226	5	1	1	—
2	221	1	3	—	—
3	240	8	—	1	—
4	216	5	2	—	1
5	199	6	1	—	—
6	202	3	—	—	—
7	186	7	—	—	—
8	219	8	—	—	—
9	229	11	—	1	—
10	241	20	—	—	—
11	199	67	—	—	1

TABLE D.—*General Analysis—contd.*

True age in months.	Stated age—Census—in years.				
	0.	1.	2.	3.	4.
12	1	243	1	—	—
13	1	209	2	—	—
14	3	196	4	—	—
15	1	208	4	—	—
16	—	171	1	—	—
17	2	184	6	—	—
18	1	198	8	1	—
19	1	179	15	—	—
20	—	195	20	1	—
21	—	195	28	—	—
22	2	175	51	—	—
23	1	151	89	—	—
24	1	4	211	1	1
25	—	3	164	3	—
26	—	2	178	6	—
27	—	—	218	9	—
28	—	1	177	6	—
29	—	—	161	11	—
30	1	1	172	6	—
31	—	1	172	13	—
32	—	—	182	30	1
33	—	—	185	26	1
34	—	1	191	42	1
35	—	—	165	78	1
36	—	—	4	210	1
37	—	4	2	169	1
38	—	1	2	189	3
39	1	—	6	173	7
40	—	—	2	177	5
41	2	—	—	165	3
42	—	—	3	161	8
43	1	1	—	175	15
44	—	1	1	156	15
45	—	—	1	164	25
46	—	1	2	186	35
47	—	—	2	126	50
48	—	2	—	5	168
49	—	—	1	3	162
50	—	—	1	6	160
51	—	2	1	2	162
52	—	1	—	2	183
53	1	—	—	6	163
54	—	—	1	1	155
55	—	—	—	—	146
56	—	—	2	3	135
57	—	1	—	1	180
58	—	—	—	—	179
59	—	—	1	1	133
	2,646	2,473	2,444	2,317	2,101

A RAPID METHOD OF CALCULATING AN AVERAGE AGE.

By JAMES CRAUFURD DUNLOP, *Superintendent of Statistics in the Office of the Registrar-General for Scotland.*

[Read before the Royal Statistical Society, April 18, 1916,
Sir JERVOISE A. BAINES, C.S.I., Hon. Vice-President, in the Chair.]

I VENTURE to bring under the notice of this Society a method which I have devised for the rapid calculation of an average age, or for other similar calculations, because by personal experience I find it to be an improvement on the ordinary method, in that it not only expedites and simplifies the work, but also puts the calculations on paper in a form in which they are readily checked.

I take as an example of such a calculation the working out of the average age at death of males dying in England and Wales during the year 1913. These deaths in all numbered 261,687, and—subject to a rough distribution of those recorded as of persons aged 100 and over—cover all ages from 0 to 108. By the ordinary method each of the 108 frequencies, that of age 0 excepted, would be multiplied by the respective age, after which the products would be summed, and the sum of the products divided by the total number of deaths, the result being adjusted by the addition of half a year to compensate for the omission of fractions of years in the tabulation and in the calculations. In this process 107 multiplication sums would be required, and the majority of them would be sums of compound multiplication. When these multiplications are completed the only check on their accuracy is a complete re-working, there being no short cut.

The object of the method is to reduce the amount of multiplication to a minimum, and this is done by summing all frequencies which have to be multiplied by the same digit of age. Consider the 108 frequencies in this sample calculation. Of them those pertaining to ages 7, 17, 27,—107, have all to be multiplied by 7, as have also those pertaining to age 70, 71, 72,—79, and this means that multiplication by the number 7 has to be performed 21 times in all, 11 times being as a unit digit in the multiplier, and 10 times as a tens digit in the multiplier. Similarly by the long method multiplication by 3 is performed 21 times, and multiplication by 6 the same number of times. Now what the new method does is to reduce each of these groups of 21 operations into a single operation, and this is done thus:—

1. Record the frequencies in a contingency table so that all having the same units digit are in the same row, and all with the same tens digit are in the same column. For this purpose it is convenient to treat ages of 100 to 109 as having 10 as their tens digit.

2. Cross cast the table. The sums of the rows will be the sums of the frequencies of the ages with the same units digit, and the sums of the columns will be the sums of the frequencies of the ages with the same tens digit.

3. As a check on the correctness of the additions, sum the totals of the rows and of the columns, and the two sums should be found to equal each other, and also the total frequency.

4. Neglect the sums of the frequencies in the first row and in the first column—those falling to be multiplied by 0 do not influence the sum of the products. Bring the sums of the rows under those of the columns placing each one place to the right, which has the effect of multiplying the latter by 10, as in ordinary compound multiplication. The sum of the second row falls to be placed under the sum of the second column, that of the third row under the sum of the third column, and so on. Add the two sums now under each column and check by repetition.

5. Multiply each of the sums so obtained by its respective number, and the sum of the products will be the Total Years of Age such as is got by summing the 107 products obtained by the long method. Check by repetition.

6. Complete the calculation as by the long method.

I show in Tables I and II the complete working of this sample calculation up to the obtaining of the total years of age. In the tables, for reasons of clearness, I do not place the figures exactly as described above, or as would be done in practice, for by the above rules the calculations shown in Table II would be placed under Table I, but perhaps this division may make the working rather more evident.

I specially draw attention to the ease of checking the figures in both tables; those of Table I are completely checked, the totals of the rows and those of the columns both summing to 261,687, while the arithmetic in Table II is so simple that all calculations can be easily and rapidly repeated.

The completion of the working of this sample calculation is:—

$$\text{Average age} = \frac{10{,}185{,}044}{261{,}687} + 0{\cdot}5 = 38{\cdot}9 + 0{\cdot}5 = 39{\cdot}4.$$

TABLE I.—*Ages of males dying in England and Wales during* 1913.

		Tens digits of age.											Sums of rows.
		0	10	20	30	40	50	60	70	80	90	100	
Units digits of age	0	53,964	719	1,075	1,376	2,054	2,753	3,509	4,087	2,518	403	2	72,460
	1	13,477	692	1,137	1,310	1,834	2,448	3,308	3,711	2,027	329	2	30,275
	2	4,989	622	1,021	1,488	2,212	2,930	3,935	4,353	2,191	248	2	23,991
	3	3,001	658	1,052	1,559	1,968	2,953	3,790	4,241	1,871	179	2	21,274
	4	2,232	686	1,069	1,587	2,051	2,851	3,811	3,889	1,658	118	1	19,953
	5	1,892	772	1,178	1,672	2,324	2,737	3,962	3,774	1,289	81	1	19,682
	6	1,320	848	1,151	1,676	2,199	3,190	3,593	3,493	1,181	53	1	18,705
	7	1,088	905	1,152	1,818	2,158	3,035	3,683	3,159	928	43	1	17,970
	8	865	1,062	1,238	1,946	2,566	3,286	4,037	2,929	724	26	1	18,680
	9	792	1,023	1,327	1,893	2,728	3,440	4,174	2,740	562	18	—	18,697
Sums of Columns		83,620	7,987	11,400	16,325	22,094	29,623	37,802	36,376	14,949	1,498	13	261,687

Experience has satisfied me that working averages by this method occupies only a fraction of the time required by the longer method, and that the checking of the results is simpler, quicker and more certain.

The algebraic proof of the method depends on the Law of Distribution, and is so obvious that it does not call for any explanation.

TABLE II.

Multiplier.	Multiplicand.	Product.
1	79,870 + 30,275 = 110,145	110,145
2	114,000 + 23,991 = 137,991	275,982
3	163,250 + 21,274 = 184,524	553,572
4	220,940 + 19,953 = 240,893	963,572
5	296,230 + 19,682 = 315,912	1,579,560
6	378,020 + 18,705 = 396,725	2,380,350
7	363,760 + 17,970 = 381,730	2,672,110
8	149,490 + 18,680 = 168,170	1,345,360
9	14,980 + 18,697 = 33,677	303,093
10	130	1,300
	Sum of products	10,185,044

DISCUSSION ON DR. DUNLOP'S PAPERS.

Sir TIMOTHY COGHLAN said the Paper on "The Error of Statement of "Ages of Young Children in a Census" dealt with an aspect of census work that, as far as he knew, had not been touched upon by previous investigators. It did not, however, call for much discussion, not that it was not an interesting subject, but because there could be no dispute as to the correctness of Dr. Dunlop's conclusions. The first point that struck him about the investigation was the small percentage of errors which had been discovered in the census returns, for after all 7 per cent. of errors, most of them somewhat trivial, was not an important matter, and showed, he thought, that census taking nowadays was fairly accurately performed. In a sense the Paper was a study in idiosyncrasy. They heard that the Scotch were the salt of the earth, and Scotland contained more clever people to the square mile than any other country, but even so they were liable to make just the same class of errors as were other people. He wondered whether Dr. Dunlop would be able to tell them what class of people made the errors with which he dealt, whether all classes or only the comparatively uneducated. It was a common experience when an uneducated person was engaged on daily work and employed, say, from Monday afternoon until the same time on Thursday, to find him claiming for four days, thus counting in the first as well as the last day, and similarly in setting down the age of a child on a census paper, the year of birth and the census year were not infrequently both reckoned in. That he thought was the root idea out of which these census errors came. The second noticeable point about the investigation was the fact that the number of children returned as at age 0 was more considerably understated than at any other age. The number would doubtless have been even less than they were returned, if there had been a possibility of understating age 0 as well as of overstating it, but even Dr. Dunlop's clever countrymen would find a difficulty in understating the ages of children in their first year. All census takers knew that the total of children aged 0-4 ascertained at a census was invariably incorrect, and they usually set aside the census figures, substituting others based upon a calculation of the number of survivors at each age as ascertained from the registrations of births and deaths. He was curious to know how the census figures for Scotland, corrected according to Dr. Dunlop's percentages of error, would compare with the figures deduced directly from the returns of births and deaths. This would be an interesting comparison. He commended the Paper to the consideration of the writers of census reports; it would afford them food for reflection, and possibly lead to a modification of the views which some of them had recently adopted.

Mr. F. Finch said that the two subjects Dr. Dunlop had discussed in the Papers were of extreme interest to him personally. Taking the first one, the question of the error in the statements of ages of young children, they had always been regarded as being very unsatisfactory, and he believed it was on very rare occasions that they had been used for calculating death rates. If it were necessary to calculate death rates or to construct a life table, they had always fallen back on getting a theoretical population based upon the number of births recorded, say within five years of the census, and the number of deaths of children which had occurred in appropriate intervals. He felt that Dr. Dunlop had performed a very good service, because he thought that was the first time any attempt had been made to determine a definite measurement of the amount of mis-statements that was made at the several infantile ages. As Dr. Dunlop's work bore on it, he proposed to read an extract from the last census report. In several of the census reports comment had been made on the anomalous nature of the recorded ages of young children, and in the report of the census of 1911 reference was made to the error of stating the "age next birthday": "The form "of error described under this heading has been assumed to exist "from the fact that at all censuses the numbers enumerated in the "second year of life show an apparent deficit. In 1911, however, at "least, there are grounds for suspecting that this deficit extends "to the first year of life as well, though here it is less obvious, as it "cannot be deduced from the curve of age distribution. It becomes "a question, therefore, how far an explanation which can apply "to the second year of life only is true even for that year. It has "been assumed that in some cases the age next birthday is given "on the schedule instead of the age last birthday. This error, "if spread evenly over all the ages, would not appreciably affect "any year except the first, for the gain from the preceding would "approximately balance the loss to the succeeding year of life. "There is, however, a check on this tendency as regards the first "year of life in the instruction on the schedule that the age of "children under one year is to be shown in months. Presumably, "therefore, mis-statement of age is at a minimum in the first year "of life, so the error in question first comes into play in the second "year, from which it transfers children, without compensation to the "third." He thought Dr. Dunlop's figures showed conclusively that that error did come into play in the first year of life. That was borne out clearly by Table D., and it showed there was a gradual pushing on of the children. Those nearly one year old would be stated to be fully one, and those nearly two would be stated to be fully two years, and so on. He thought Dr. Dunlop's figures gave them the means of testing the census results. So far as securing accurate returns of population was concerned, there was another question which came in, namely, the question of escape of enumeration. At the time when the report on ages was being made, and Mr. King was graduating the enumerated numbers, an estimate was made in the Registrar-General's department of the number of children who ought to be surviving at census date out of the children who were born within five years of that time. The figures came out in this way. The enumerated population under one was 782,000 nearly, and the number estimated who ought to be living was 832,000, or 50,000 more than the actual enumerated number. At age one to two the number enumerated was 743,000, and the number estimated 797,000, or a deficit in the enumerated of 54,000. Mr. King, after he had considered these figures, came to the conclusion (and he thought it was a justifiable conclusion at the time) that there was a large amount of enumeration which escaped at those ages. But Dr. Dunlop's figures threw some further light on this point. Dr. Dunlop showed that the number enumerated under one were understated by about 5 per cent. If they added 5 per cent. on to the enumerated population, that brought the total up to 821,000 and left a deficit as compared with the estimated total, of only 11,000, as against 50,000, if the actually enumerated number was taken. It seemed to him there was very little reason for suspecting now that at age nought there was any serious escape of enumeration; but there might be a little. At the next year of age, age one to two, if they increased the enumerated number by 3 per cent., that brought it up to 765,000. That number was still 32,000 short of the number estimated from births and deaths, which was a substantial difference, and there might be reason for suspecting more numerous escapes of enumeration at that age. He asked Dr. Dunlop whether he had any reason for suspecting in examining his slips that there was an escape of enumeration. Dr. Dunlop had said that in the case of Paisley he identified 84 per cent. of his census slips, and in the case of Haddington he identified 82 per cent. In the case of the slips copied from the birth entries, the number recognized was less than 70 per cent. He had looked into the figures for Scotland at the time; and, judging by the general death rate, and also by Dr. Adams' life table, he would estimate that out of the children born in Scotland—he did not know whether it would be the same in Haddington and Paisley—15 per cent. of the children born within five years of the census would have died by census time; so that 85 per cent. of them would be existing somewhere. Thus 15 per cent. were accounted for by death, and 15 per cent. remained to be accounted for because they had moved out of the district, or because they were not identified owing to the entries not being comparable, or that they were not enumerated. He would ask Dr. Dunlop whether he could throw any light upon that question, because it was a very serious one. He had dealt with the question of non-enumeration for the first two years only; he might say that the enumerated population at age two years agreed very closely with the estimated; it was only 300 short. When they applied Dr. Dunlop's correction, and reduced the enumerated number by ·7 per cent., it gave a much bigger difference, namely, a shortage of 5,847. When they went on to age three, a similar correction increased the difference between the enumerated and the estimated population from 2,300 to 22,500. Those figures rather puzzled him, and he would not attempt to explain them, but probably one would not expect to find very close agreement at this age. He thought Dr. Dunlop had thrown a very interesting light on the subject, and had removed from his mind to a very large extent the suspicion that existed that there was a serious escape of enumeration. On the other subject, that of the estimate of an average age, Dr. Dunlop's method was a pretty arithmetical device, and saved an enormous amount of labour when compared with the ordinary process of multiplying the number at each age by the appropriate age and summing the products in order to get the total years of life. In the Registrar-General's Department they had used the following method to determine the mean age at marriage when the ages had been tabulated by single years of age, that was for one year only, but for thirty years or more they had used the method in a modified form when they had the figures in quinquennial age groups only. The numbers in Dr. Dunlop's Table I would be entered in a single column against the proper ages from 0 to 108. The number 1 against age 108 would be entered against the same age in a second column. That would be added to the 1 at age 107, and the sum of 2 entered against age 107 in the second column. That sum of 2 would be added to the 1 against age 106, and the total 3 entered against age 106 in the second column, and so on to the top of the column. The sum of the second column would give 108 times the number of entries at age 108, 107 times the number at 107, and so on. That sum divided by the total deaths gave the mean age at death, less half a year. He mentioned that because it might be of interest to those who were not familiar with the method. He certainly thought the new method effected a still further saving of time over the method at present in use in the present Register Office; and Dr. Dunlop was to be complimented on the neatness of his device. He had very much pleasure in seconding the proposed vote of thanks.

Mr. DE JASTRZEBSKI said he would like to congratulate Dr. Dunlop on his extremely interesting Papers. He did not want to go into detail in the matter, as Mr. Finch had dealt with it very thoroughly. In congratulating him, he might say how sincerely those of them in the Statistical Department of the General Register Office in England envied their colleagues in Scotland who were able to pursue investigations of that kind, which were so valuable and so interesting, under present conditions. Heaven only knew what they would give to be able to do something of the sort themselves. The only drawback in the Paper dealing with the mis-statement of age census was, that the sample was a somewhat limited one, and he hoped that Dr. Dunlop would be encouraged to extend his inquiry; because it was, from the point of view of anyone who had anything to do with the census, of extreme importance. He thought no one had done anything of the sort before; and Dr. Dunlop could congratulate himself on having upset a good many conclusions which had been arrived at by people from that process of reasoning which consisted in saying "Here is an awkward thing staring us in the "face; how can we explain it?" and explaining it by assuming something, as in the case that Mr. Finch pointed out of the frightful drop between the ages 0 to 1 and 1 to 2 in the census for England and Wales of 1911. Mr. King concluded there was something wrong in the mis-statement of the first year of life, but the smallness of the numbers was easily accounted for by non-enumeration. If Dr. Dunlop's figures were applied to their census figures of 1911 as correctional figures, they brought the census figures of England and Wales, as regarded the first year of life, practically into line with what they would expect them to be. On the other hand, the graduated table of ages suffered a most unholy shock, because it was founded on the idea that the first age was correct and the others were graduated up to them. So that as one of those who found a peculiar pleasure and joy in administering shocks to his statistical friends, he heartily congratulated Dr. Dunlop on his bomb-shell. The most difficult point of the lot, and the one which Dr. Dunlop made more insoluble than ever, was the drop from ages 0 to 1 to 1 to 2. It was emphasized if they applied the correctional figures. If they did that they had that enormous fall between the first year of life and the second year of life emphasized instead of being in any way smoothed away. Of course, the hump at the ages 2 to 3 was partially explicable at least by the fact that the fall in the birth rate between 1908 and 1910 was extremely rapid, and much more rapid and marked than in the years preceding. That would naturally hump up the number of children between those two ages. He hoped that Dr. Dunlop in the course of his reply would repudiate any such thing as that there were uneducated people in Scotland. There were plenty in England; but north of the Border there was no such thing as uneducation, and whatever the cause of error might be, it was not due to any shortcoming in education on the part of those who lived north of the Tweed and were the salt of the earth.

Mr. C. A. EVERARD GREENE said with regard to Dr. Dunlop's rapid method of calculating the average ages, so far he had never heard of its being used where written records were concerned, but he had had experience of its being used where records in the shape of punched cards were used in connection with the Hollerith Tabulating machines, but never on such work as Dr. Dunlop mentioned. In connection with commercial statistics, such as the division of values in proportion to the distance travelled on sections of railways, and dividing up the total revenues over those sections, that principle, which was called summary multiplication, was used, and he knew of a case of one railway alone where it saved about one hundred thousand calculations a month.

The CHAIRMAN (Sir A. BAINES) said he would like, before calling upon Dr. Dunlop to reply, to associate himself with the remarks made by the other census takers who had spoken, especially with regard to the difficulties connected with the record of ages under five. As Sir Timothy Coghlan had said, none of them paid any attention to the census record of these ages when engaged on a life table, because of the extraordinary irregularity of the figures for the different years. It was therefore most valuable to have a sample, even a small one, analysed as minutely as Dr. Dunlop had done. His scrutiny indicated one or two points where difficulties might be solved if the date were to be obtained over a wider field. All the same, he was inclined to think that a good deal of the irregularity after the first year was not due to error in the record entirely, but to a real difference in fact, because the influences that mainly affected infant life acted with such different intensity in different seasons. Perhaps the almost invariable deficit in the fourth year might be termed psychological in its inaccuracy, as people, in some countries, preferred the round number five, and, as in India, thought four an unlucky number. Later on in life, eleven was an age very feebly recorded at the Indian census, whereas the very lucky number twelve received an undue accretion. As to the second Paper, he could agree with Mr. Greene, that it showed a remarkably expeditious way of getting over these extensive calculations. He himself had never tried it, but had worked on the brutally simple way of giving his arithmometer a good oil bath, and grinding away. It did not hurt the machine, and put less strain on the brain. Dr. Dunlop's method entailed a certain amount of mental adjustment which might tell more on the clerk by the end of the day than a longer spell of whirling round the handle of the arithmometer.

Dr. DUNLOP, in reply, said he thanked them for the very kind hearing they had given the Papers and for the remarks the speakers had made. Sir Timothy Coghlan had laid stress on the smallness of the total error, on which he quite agreed ; but when one came to analyse it, the error was sufficient to upset the true representation of fact. Smoothing was necessarily required, and the error was there, and was one which would continue to require to be dealt with. The question whether it was more frequent among the educated or the uneducated was difficult to say, because those who were fairly well educated in England or Scotland formed the large majority and the preponderating quantity. He thought they were reasonably safe in assuming that these observations fairly represented what happened among the reasonably educated class of person. The illiterates were very few. As regarded age 0—as Sir Timothy Coghlan was aware—they did not ask people to report their age as age 0 in the census. When the age was under one, the parents were asked to state the age in months, which was a certain safeguard. He did not lay stress on it, and did not elaborate the conclusions very much ; but what struck him when he came to work out the results was, how the observation of a 5 per cent. deficit at age 0 completely upset all their conceptions of the nature of the error in the census return. That, to his mind, was the most palpable result which they got. For instance, the comparison between the crude census figures under five and Mr. King's adjustment of the census figures under five makes this evident. Mr. King wrote an interesting chapter discussing the pros and cons of the different methods, and decided to use the figure of age 0 as correct, and started his graduation from that. Mr. King, of course, had not this information at his disposal ; and Dr. Dunlop felt fairly confident that when Mr. King saw it, he would change his opinion, and deal with the frequency at age 0 as the most erroneous of the five ages under five. The great difficulty is to know where to make the adjustment. They might take age 2 as correct, age 0 as too small, age 1 as too small, and ages 3 and 4 as in slight excess, but for graduation purposes the movement apparently must come from a good deal higher up the scale than age 5. But this research was limited by age 5, and consequently from it one cannot decide from where the adjustment should be made. He does not look forward with confidence to the method used, one of sampling, producing good results much if any after age 5, because with each advancing year of age the amount of recognition becomes less and less, no doubt due to migration of families from one town or district to another. Mr. Finch has raised a point about the number escaping enumeration. General observation when going over the slips used in this research did not suggest any such escape. Mr. Finch also referred to the English Census figures showing a deficit when compared with an estimated population of under five, which was prepared by Dr.

Stevenson at the request of Mr. King. This estimate was made from the registered numbers of births and deaths, and amounted to 3,958,213, which is 472,448 more than the enumerated number. But the method of estimation used differs from the orthodox in that the estimated numbers at each age were not adjusted so as to sum to the same amount as the census figures. There may have been some good reason for not making that adjustment. However the procedure was not completed, and hence the excess of the estimated over the censal figures. When the estimated figures are adjusted to sum to the same amount as the censal figures, one gets what appears to be a better graduation of the population figures of these ages than that got by Mr. King's method, for it avoided the fallacy of accepting the frequency at age 0 as correct. Referring to his Paper on a method of estimating averages Dr. Dunlop expressed interest in Mr. Greene's remarks that a similar principle had been found useful in calculating averages from figures tabulated by the Hollerith tabulating machinery. Apropos of the rapidity of the new method, Dr. Dunlop explained how in the office of the Registrar-General for Scotland it took nearly half an hour for an experienced clerk with a well-oiled arithmometer to calculate the average age at marriage in a county, while by this method the same work was done in under five minutes, and done with a greater certainty of correctness.

A vote of thanks was passed to the author.

The following Candidates were elected Fellows of the Society:—

Alfred E. Lewis.
Alexander Loveday.
Maurice Melglave.
George B. Wilson.

The Normal Law of Progress.

By Professor R. A. Lehfeldt, D.Sc.

One has to ask, sometimes, whether material progress is the normal condition of mankind, or even whether it is going to be so in the future. Certain movements, it is clear, cannot go on for ever: one of these is the increase in the number of the human race, which must eventually be limited by the area available for them to live on. The more one looks into the statistical evidences of progress, the more it appears probable that this is a typical instance, and that a stationary condition should be regarded as the normal one. If that is so, progress must consist in a transition from one stationary state to another, and this transition may be expected to show some uniform characteristics. It must be produced by the uprising of a group of social forces, modifying a condition in which they have been long latent: time is needed for the forces to develop their strength and spread their effects through the community. There is a period of acceleration in the movement: then one of steady change: then a period in which these social forces lose their efficacy, or die away, leaving a new stationary condition of society.

The whole period of evolution may be expected to last in some cases through a number of generations: and, of course, a new movement may arise before an old one is completed. But the above description may be regarded as applying to a typical, important movement of progress that has time to work itself out. We may put it into mathematical language as follows:—

Let q be the quantity whose changes in time t are to be studied. It is not to be expected that the changes of q itself should be symmetrical in time, for all the changes observed in the later half of the period of change refer to values of q larger—possibly many times larger—than in the earlier half. But log q may very possibly undergo symmetrical changes, so we will assume that it is a "normal error function" of the time, *i.e.*,

$$\log q = \log q_0 + k\mathrm{F}\left(\frac{t}{\mathrm{T}}\right)$$

where q_0 is the value of q at a certain moment (the "epoch"): t is the time in years before or after the epoch: T is a constant period and $\mathrm{F}(x) = \frac{1}{\sqrt{\pi}}\int_0^x e - x^2 dx$ and k is a constant.

Unfortunately there are very few statistical records extending over a long enough period to afford any means of verifying this formula. We will apply it to the record of population of England and Wales. The great wave of increase seems to have had its origin in early Stuart times. The figures before the census of 1801 are, of course, subject to great uncertainty: I take them as given in Mulhall's "Dictionary of Statistics," the *Encyclopædia Britannica* ("England"), *Whitaker's Almanack* (which quotes no authority), and Professor Gonner's paper (*Journal*, February, 1913, p. 261).

By trial and error it was found that the following values give a curve fitting the observations fairly well:—

$$\log q_0 = 7{\cdot}2$$
$$k = 0{\cdot}932$$
$$\text{T} = 90 \text{ years}$$
$$\text{epoch} \quad 1840$$

The following table shows the relation between the observed and calculated figures:—

England and Wales. Population.

(000 omitted.)

Date.	Calculated.	Census.	Mulhall.	*Encyclopædia Britannica.*	*Whitaker.*	Gonner.
1660	5,430,	—	5,500, (in 1672)	—	5,774, (in 1670)	—
1690	5,520,	—	—	5,475, (in 1700)	6,045, (in 1700)	5,800, (in 1700)
1720	5,780,	—	6,280, (in 1712)	—	—	—
1750	6,430,	—	7,020, (in 1754)	6,467,	6,517,	6,320,
1780	8,040,	—	8,080,	—	—	8,890, (in 1800)
1810	10,750,	10,100,	—	—	—	—
1840	15,850,	15,710,	—	—	—	—
1870 ...	23,400,	22,420,	—	—	—	—
1900	31,300,	32,180,	—	—	—	—
1930	39,100,	—	—	—	—	—
1960	43,500,	—	—	—	—	—

The upper limit of the calculated populations is 46,300,000 inhabitants.

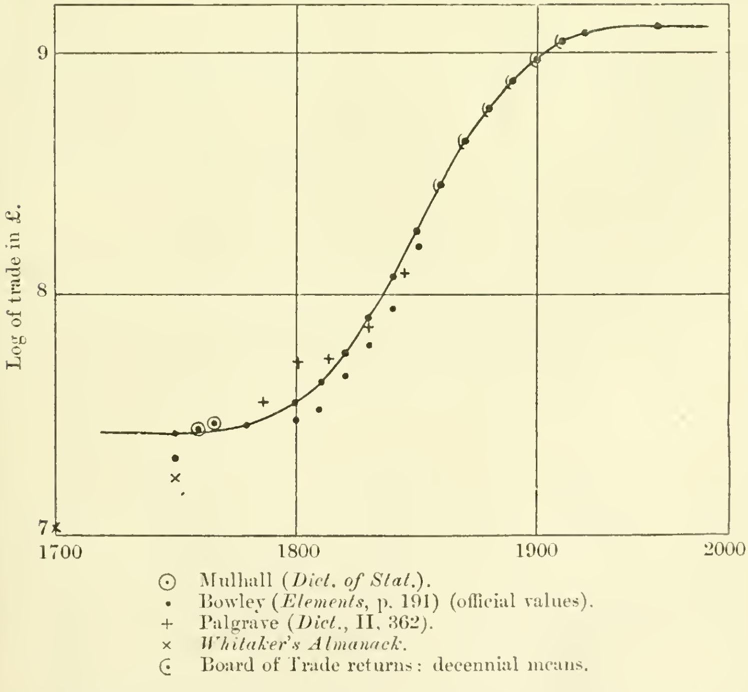
It is seen that the general course of the movement is very fairly given by the formula. Even such an event as the present war must be regarded as an unimportant incident when this secular movement is considered. It is, of course, possible that the war might lead to some extensive change such as increased emigration, or a reversion to a more agricultural type of population in England; but it may fairly be argued that secular causes are tending to bring the population of England to a limit, and that whether these causes act uniformly as in time of peace, or in a cataclysmic fashion in a great war, makes little difference to the result—the war is merely an incident in the working out of the secular forces.

Another example is to be found in the external trade of the United Kingdom. The increase in trade is, of course, largely due to the same causes as increase in population, but as the statistics show certain features of their own it is worth while analysing them.

There is much greater irregularity in short periods, in trade than in population: to overcome this difficulty decennial averages have been taken—the average of the years 1886-95, *e.g.*, being set at 1890, and so on. Again, trade is given in terms of money, and must be reduced to a fixed price level, in order to give intelligible results: for this purpose the index-numbers given in Layton's "Introduction to the study of prices" have been used. When the numbers for trade in recent years are reduced in this way they show a regularity that is somewhat surprising. On the other hand, the early records are of little value.

Development of British trade.

(Values reduced to price level 1900.)



The great increase was in the nineteenth century, but it was not a simple movement in the sense contemplated in this note, for it did not arise out of a definite stationary state at an earlier time;

rather it may be regarded as superposed on an earlier and smaller movement. Even so, however, it can be represented accurately enough by the constants—

Epoch 1850 log q_0 = 8·27
T 50 years k = 1·69

The results are shown in the figure: the calculated curve agrees almost precisely with recent observations, and lies amongst the very discrepant early ones. The price index (itself very uncertain in the earlier years) reduces the values to the price level of 1900. Reckoned on that basis a limit to British trade at 1,300,000,000*l.* is indicated. This may be an entirely unwarranted piece of extrapolation: but on the other hand, it is not reasonable to expect the maximum percentage increase to be maintained for ever, or to be alarmed because Germany, which is at an earlier stage of its development, shows a higher percentage increase than England does.

As a third instance the evolution of the birth-rate may be taken. This is more definitely of the type, since it is a change from a state of equilibrium with high birth-rate and high death-rate to another with low birth-rate and low death-rate—unless, indeed, we expect the fall to continue till the birth-rate is zero!

The figures chosen are for the German empire. Before the Franco-Prussian War the birth-rate was pretty steady at 36 per 1,000. Immediately after the war it reached an abnormal level, but by 1880 had settled down again, and showed no signs of change till the end of the nineties. Then a fall began, which, as nearly as can yet be judged, follows the equation with constants—

Epoch 1914 log q_0 $\bar{2}\cdot43$
T 12·8 years k 0·268

It is interesting to see not only how this equation compares with the facts in the past, but what forecast it gives:—

Germany. Birth-rate (excl. still-born).

Date.	Observed (triennial mean).	Calculated.
1889	36·2	36·5
1894	36·3	36·3
1899	35·8	35·5
1904	33·7	33·7
1909	33·0	30·6
1914	27·3*	26·9
1919	—	23·6
1924	—	21·5
1929	—	20·4
1934	—	19·9
1939	—	19·8

* For the year only.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*Inleiding tot de beoefening der Statistiek.* Deel 3. *De toepassing der statistische methode op het gebied van het sociaal-economisch leven en van de huishouding der publiek-rechtelijke lichamen.* Stuk 1. *De Statistiek van het Bedrijfsleven.* By Dr. C. A. Verrijn Stuart. 306 pp., 8vo. Haarlem: de Erven F. Bohn, 1915.

It would seem to have been the author's original plan to complete his *Introduction to the Study of Statistics* in three volumes.

A third volume of the work is now before us, but the range of subjects that lend themselves to statistical treatment has proved to be so wide that the author has been obliged to reserve for a fourth volume (which he hopes to complete by the autumn of 1917) the discussion of statistical methods as applied to the distribution of the national dividend. In the volume now under review he is concerned only with the application of the science in the sphere of production.

The subject-matter—apart from a general Introduction—is dealt with in five chapters, viz.: I. Censuses of Occupations and Industries; II. The Organization of Production; III. General Statistics of Production; IV. Statistics of Branches of Production; V. Statistics of State Intervention in Production.

The branches of production to which separate sections are given in Chapter IV are: (1) Agriculture (with fishing and game preserving);

(2) Manufactures and mining; (3) Commerce; (4) Transport and communication, and (5) Banking. The fact that commerce, transport and banking find a place in this chapter is justified by the comprehensive sense of the Dutch word *Bedrijfsleving*, which is only imperfectly translated by our own word "Production," but which the author defines as embracing all "activities in which mankind, "living in ordered society, engages for the satisfaction of its wants." The fifth chapter consists of three sections headed respectively:— The Promotion of Production; Statistics of Coinage, and Statistics of the Supervision of Production.

With so large a number of subjects to handle the author had necessarily to confine himself to leading examples of their statistical treatment in different countries; and, since the treatise is intended for the use, not of professional statisticians, but of Dutch students of economics, one is not entitled to feel, much less to express, disappointment when the material selected for illustration seems scanty in relation to the quantity available, as, for example, in the case of statistics of prices (pp. 193-227).

The greater part of the general introduction to the present volume is concerned with the statistical method that goes by the name of semiology, in which various economic index numbers are used for measuring fluctuations in the general well-being of the social body. In this connection the author is mainly concerned with two ways of applying the method, one identified with the name of Neumann-Spallart, and the other with that of de Foville, the essential difference between the two being that in the one case (Spallart) the various indices are combined to form an aggregate index number, while in the other case (de Foville) they are not. While approving of de Foville's plan, which considers the individual indices by themselves and allows them to convey their own lesson as to what their aggregate effect may be, the author sees no objection in principle to the construction of an aggregate index number, if only it were possible to weight each separate index, or group of indices, according to its significance as a symptom of increasing or declining vitality in the social body. Our present knowledge of causality in economic life is, however, too restricted to warrant any such attempt. We must not try to "run ahead of the gradual development of science." The author refrains from expressing any opinion on the nice question of the permissibility of combining moral with economic indices in the construction of the aggregate index number, as also on the manner of dealing with the difficulty that arises from the fact that in the case of some phenomena the index numbers can only fluctuate within narrow limits, while in the case of others the range of fluctuation is very wide. With regard to these matters the student is referred to the report of the discussion which took place at the Royal Statistical Society in connection with Professor Julin's paper on the "Economic "Progress of Belgium from 1880 to 1908."[1]

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[1] *Journal*, February, 1911, pp. 304–313.

Incidentally the author criticises Professor Julin's (also Benini's) method of inverting the index numbers for unfavourable indices. According to that method a rise in the number of bankruptcies from 100 to 110 is made to appear as a decline from 100 to 90 in the welfare-level, so far as that particular symptom is concerned. The effect of this is to exaggerate the significance of an increase and to minimise that of a decrease of this negative symptom. For, suppose the number of bankruptcies in a country to have doubled in a given period. Then, in the matter of bankruptcies, that country was in twice as favourable a state at the beginning as it was at the end of the period. But, according to Professor Julin, the index number for bankruptcies would have fallen from 100 to 0, thus creating the wrong impression that the condition was a hundred times better in the first than in the last year! On the other hand, if, during a certain period, the number of bankruptcies were to have declined by one-half, the condition at the beginning would have been twice as unfavourable as at the end of the period; which ought to appear as an increase in the index numbers from 100 to 200, and not from 100 to 150. What ought to be reckoned is not the absolute, but the relative extent of the change above or below 100 $\left(\frac{100}{200} = \frac{50}{100} \text{ and } \frac{100}{50} = \frac{200}{100}\right)$.

A.A.W.

2.—*British Incomes and Property.* By J. C. Stamp. xv + 538 pp., 8vo. London: P. S. King and Son, 1916. Price 12*s.* 6*d.* net.

In his careful survey of the official statistics relating to the taxation of income and property in the United Kingdom, Dr. Stamp has rendered to all future enquirers who may desire to use these statistics a service that would be difficult to overestimate. He would be unwise indeed who, in discussing any portion of these statistics and making deductions from their apparent relations, neglected to consult the volume before us, in order to be sure that he had not fallen into any of the numerous traps necessarily presented to the uninformed, or partially informed, writer. As a work of reference in relation to a most important section of our national statistics, Dr. Stamp's book must be classed as indispensable. It is not, however, a volume to which reference is easy, or which one should sit down to read with the idea of obtaining a general survey of the extremely tangled subject of which it treats. It resembles rather a series of detailed maps of portions of a country, maps representing districts which overlap each other, and devoted to separate groups of topographical features, than a general map showing in unmistakably clear outline the features of the whole area dealt with. The nature of the subject and of the material makes this inevitable in some degree, though the mode of treatment adopted, in some of its peculiarities, increases the reader's sense of immersion in the detail of the picture.

As Dr. Stamp truly points out in his introduction, such official statistics as those with which he deals are the by-product of administrative work, and the student who vents his dissatisfaction on the compilers of the reports in which the data have to be sought, because he cannot find in them a simple and direct statement of facts required by him in connection with some particular problem, is often more than a little unreasonable in his complaint. The statistical presentation of the amount and the distribution of incomes in a given country may be the object of a student of public finance, but is no necessary part of the business of an official engaged in assessing and collecting revenue in accordance with particular tax laws. Dr. Stamp's practical familiarity with the operation of our present system of taxation of income, and his careful and thorough study of the evolution of that system from earlier times, enable him to offer expert guidance and criticism to such a student. He does more, for he has compiled tables in which allowances for changes of basis in income assessments are made and a survey of the progress of the tax is furnished to the ordinary more or less inexpert student, free of the embarrassment resulting from these changes.

A feature of no little interest in the exposition of the subject of the volume, though it adds to the distractions of the reader who may desire to attain to a clear view of the interrelations of its different parts, are the illustrations, culled from a wide range of writers, of the dangers presented to the unwary by the statistics dealt with. Doubtless some of the writers whose lapses are set forth might have a case to state in their defence, could they be heard, but the careful use of Dr. Stamp's volume should reduce the number of offences, or apparent offences, against propriety. A particularly useful chapter is that in which the application to the estimation of the National Wealth of the methods associated with the name of Giffen is examined. The possible or probable sources of error are discussed and a revised valuation on the basis of the 1914 figures of income taxation yields a total of 14,300 millions sterling, with an uncertainty of about 1,900 millions more or less.

The volume is enriched by tables in which figures needed for reference are supplied. Among the material thus made readily accessible is the classification of the assessments to the income tax of 1801. There are also a number of diagrams and the references to sources of information form a valuable feature. Workers using official statistics dealing with other subjects would find corresponding volumes, written with like familiarity with the material, of great assistance, even if it be true that the difficulties presented by income tax statistics are such as to render expert guidance more essential in this field than in many others. A.W.F.

3.—*Economics : An Introduction for the General Reader.* By Henry Clay, M.A. xvi + 476 pp., small 8vo. London : Macmillan and Co., 1916. Price 3*s.* 6*d.* net.

"The large number of books that attempt to deal with the whole "subject-matter of Economics in a single volume" published, especially in the past few years, is a welcome sign of a zeal for study which, we hope, will not diminish in intensity as its area extends.

But the author of this most recent specimen, using the language quoted, is surely right in his opinion, that an "apology is needed" for adding to the list. To justify itself, indeed, a fresh text-book must now possess peculiar merits. Mr. Clay has the potent excuse that he consults the requirements of an important class to whom the attention they demand had not, he holds, been paid in previous manuals; and his general scheme of arrangement, if not his treatment of particular detail, is a bold departure from traditional routine. Such innovation, however, together with the absence of references to other treatises, has its defects, if students proceed afterwards to a fuller acquaintance with economic principles expounded on the familiar lines; and, in catering for the large category of the "general "reader," Mr. Clay, we believe, aggravates the difficulties that beset the preparation of a text-book. In all instances the troublesome rival claims of conciseness and sufficiency, ensuring clearness without shirking difficulty, should, if possible, be reconciled. But the rare genius of a Bagehot, whom our author mentions with modest admiration in his Preface, might alone be competent to satisfy his critics in the performance of the task there described. For he has to explain the "principles" of the "construction and "working" of the "economic organization as a whole" "in the "language of ordinary life and with reference to the experience and "interests of the ordinary man."

Nor does Mr. Clay, we must add, facilitate the achievement of this arduous, though laudable, design by neglecting the common-place assistance of a full analysis, and an index, while the employment of type of varying size would, we imagine, be appreciated by not a few grateful students. They are now supposed, in their scanty leisure, to grapple, without the oral guidance of a teacher, with what must, we feel, in spite of Mr. Clay's considerable facility for statement at once adequate and plain, seem too often to be complex reasoning couched in paragraphs of formidable length set up uniformly in print of no large magnitude. These failings, however, admit of amendment in a fresh edition, and Mr. Clay has contrived to include a great amount of sane useful argument within a limited compass, and to deal instructively with some topics omitted altogether or sparsely treated in older text-books. His order of arrangement is ingenious, his command of literature is wide and exact, his appreciation of significant fact is keen, and he seldom fails to be suggestive where he does not convince. The illuminating phrase or the arresting epigram of Bagehot, and the instinctive aptitude for agreeable lively narrative of Mr. Hartley Withers, to whom Mr. Clay also alludes, do not indeed characterize a book which may, we anticipate, be found by some readers heavy rather than light; but conscientious pains in collecting and in sifting the material employed are evident throughout, and no small dexterity has been happily applied to its apposite consecutive presentation.

In gauging Mr. Clay's success we find a difficulty in defining accurately the students designated by the comprehensive label of the "general reader." From the opportune experience we understand he has derived from the close instruction of "tutorial "classes," and from a bias sometimes manifest favouring labour as compared with capital, or the partiality generally shown towards working-men when opposed to landlords and employers, we might conclude that the category of the "ordinary" man, for whom he writes, is circumscribed more narrowly than common parlance contemplates. But the "practical interest" in the "economic "system," and the "experience of its working," which he considers he can safely assume to be commanded by his readers, sometimes, we suspect, pass outside the limits within reach of the students in tutorial classes, and we even feel that the "ordinary man," conceived in the wider sense usually understood, might fail to seize at once some of the reasoning employed or, unassisted, to interpret all the allusions. The error of taking for granted too much knowledge is, of course, a fault to which the writers of text-books are unfortunately prone. A second obstacle, however, that we encounter in this instance is the doubt whether disproportionate space has not been given to the "construction" of the economic system as contrasted with its "working." The question of value, it is clear, is closely connected with the latter; but economic theory, commonly interpreted, is deferred to a stage, comparatively late, in Mr. Clay's discussion, and, when reached, it is briefly, or even inadequately, set forth. The picture of the facts of business life, on the other hand, is perhaps overcrowded with minute elaborated detail. Mr. Clay may be right, for his own purpose, in this distribution; but, as we think, he strains thereby the meaning and the scope of the term Economics. We must add that his final chapters on the intricate relations of wealth and welfare increase, and do not lessen, in our opinion, the pertinence of the criticisms we have made. In spite of the fondness Mr. Clay attaches not unnaturally to them they seem to us to be supplementary or even otiose; and they scarcely form an integral portion of an elementary manual. Their reasoning is not easy; and a few of the conclusions, here as elsewhere, might, we venture to declare, be questioned or reversed by expositors with a different bias.

L.L.P.

4.—*Why the Dollar is Shrinking. A Study in the High Cost of Living.* By Irving Fisher, Professor of Political Economy in Yale University. ix + 234 pp., 8vo. New York: The Macmillan Company, 1914. Price 5*s.* 6*d.* net.

This work was written before the war broke out, and published just after. The only reference, therefore, to the recent special rise in prices is contained, by way of prophecy, in the postcript, and the opinion was ventured that the English price level would rise less during, and more after, the war than Continental price levels—"foods will especially rise and bonds will especially fall." He considered that the changes in trade would make prices rise less here, and expansions of money and credit circulation would also tend in the same direction. The main purpose of the work is to explain to the plain man, who approaches the subject for the first time, why money does not go so far as it did, and why purchasing power fluctuates. The explanation appears to me to be admirably simple and clear, but for a real test of its appeal to the man in the street the opinion of a reviewer who has grown up with literature of this kind and cannot give a fresh response to the presentation of newly revealed ideas is hardly likely to be so satisfactory as the proved results amongst those for whom it is intended. Professor Fisher writes with his usual engaging lucidity, and expounds the quantity theory with arithmetical, not to say physical, precision, in a manner which would perhaps scandalize those who like to dwell among the "other things remaining equal" with which they qualify the theory out of useful existence, but in a fashion, too, which would make the chemist or biologist, who looks with half-concealed scorn upon "pseudo-sciences" such as economics, blink with astonishment. It is not to disparage previous work if one should declare without hesitation that this is by far the best work of its kind yet written. Most writers fail to give any satisfactory sketch of a link in the chain of cause and effect which would really be most convincing to the plain man, if properly and simply worked out—that is, the *way in which* the increased supplies of new gold begin to raise prices when they get into contact with markets and commodities, and then how the ripple works its way outwards. Professor Fisher does supply this want, but, as it seems to me, not so fully as he might easily have done. He relies upon a single motive for his expulsive force, and that motive will not appeal to everyone as the most obvious. It is skilfully indicated, with the aid of some actual experimental proof, that the habit of life which fixes the average money carried by the individual is an important factor in deciding the velocity of circulation. From this the argument runs that the miner in possession of gold beyond his requirements is *uncomfortable* until he has reduced it to his usual level, and the whole tendency to a rise in prices appears to be induced as a result of this motive—a more or less theoretical one to the reader—acting alone. It would have a far stronger appeal if the other economic motives could be visualized—the lessened marginal value of resources to the miner, the greater effective demand on a temporarily fixed supply, the disturbance of the equilibrium between the return upon capital and effort in mining compared with storekeeping, agriculture and other surrounding activities, with the flow set up to restore the level. If done in a Ricardian manner this picture would carry greater conviction to the man in the street than the mere statement that increased gold supply raises prices, even with an equation, and the ingenious illustrations of a balance with weights. The chapter on the history of price levels contains an excellent series of charts for all the countries for which index numbers have been constructed; India and Japan, in contrast to the European curves, form a telling sequel to the general story. A very formidable array of popular explanations of the high cost of living make easy skittles for Professor Fisher, and form a most practical conclusion to his argument. In the domain of prophecy for the future, not in a fine frenzy, but with a reasoned value for each item in the prospective equations, he considered that 2 per cent. would be a fairly safe minimum estimate of annual price expansion for some years. With most commendable self-restraint he keeps his own peculiar problem of "standardizing the dollar" almost entirely out of this book, which as a good general description of the quantity theory and what it involves can be most heartily commended to all.

J.C.S.

5.—*A Study of Industrial Fluctuation: an Enquiry into the Character and Causes of the so-called Cyclical Movements of Trade.* By Dennis Holme Robertson. xiii + 285 pp., 8vo. P. S. King and Son, 1915. Price 7*s.* 6*d.* net.

Industrial fluctuation is "the alleged alternate occurrence of "periods of industrial expansion and of industrial depression." Taking a single trade, "there seems no good reason to regard a mere "decline in margins—still less in one constituent element of margins "—as constituting depression, unless it is accompanied by a decline "either in aggregate net receipts, aggregate net profits, or the net "rate of profits. Our choice then lies between these three. . . . "It seems hopeless to attempt a decision." General depression is "a condition of general disillusionment on the part of investors," but "while excessive investment in a single trade results in an "undesirably large volume of its products entering into the "consumption of other trades, excessive investment in all trades "apparently results in an undesirably small volume of their joint "products entering into their joint consumption." Intensity of fluctuation depends partly on the period of gestation, or the period it takes to produce new implements of production. "The longer this "period of gestation, the longer will the period of high prices continue, "the greater will be the over-investment, and the more severe the "subsequent depression." In some trades like coal, Mr. Robertson holds that the period of gestation is becoming so long that it is a deterrent to over-investment, but he admits that Mr. D. A. Thomas (now Lord Rhondda) does not share this view, which is unfortunate for Mr. Robertson. Accessibility to resources either through credit or the machinery of joint-stock companies is another temptation to over-investment. The difficulty of shutting down large works and stopping expensive machinery is an aggravation of depression. Fluctuations may also arise from changes in costs or in the supply of raw materials. Causes affecting demand are fashions, wars, and tariffs; crop volumes, transport and construction; crop values and construction; crop values and consumption—and these are discussed in successive chapters. Revival; crisis and depression; and the wage and money systems are discussed under the general heading of fluctuations of general trade.

It is not possible to discuss all these chapters in detail, for, although Mr. Robertson has collected a considerable body of facts, one feels that a much greater body has still to be collected and that a much more detailed analysis and a closer synthesis need to be made. One example of the questions discussed may be given. Mr. Robertson points out that as the demand of the English working-classes for wheat is inelastic a low price of grain is correlated with an increased prosperity of the consumptive trades. "In particular this factor "seems to be of the first importance in determining some of the most "characteristic movements of the English clothing trades. For while "the cotton trade is mainly dependent on the Indian grain-consumer, "and certain branches of the woollen industry are much affected "directly and indirectly by the fortunes of American agriculturalists "and other foreign customers, the course of our woollen and clothing "trades on the whole is very much more dependent on the movements "of home demand." Thus it was partly owing to "the sharp rise in "wheat prices in 1872–3 that the woollen trade failed to share in the "general elation of trade in those years. But in 1874–6, when "depression in the great constructional trades was accompanied "by a rapidly falling level of wheat prices, the home branches of the "woollen trades seem to have done on the whole very well." The historic comparison goes on, but we may here interject a query as to why the high wages of 1872–3 did not sufficiently offset the high price of wheat. In fact, one feels that we require a series of monographs and that Mr. Robertson's book may well serve as a general introduction indicating the points where investigation is necessary. Mr. Robertson's general theory is that production increases under the influence of increased productivity due to improved processes, of increased bounty of nature, and of an increase in the expected future productivity of constructional goods, coupled with an expansion due to increase of confidence or of gold or of credit. Depression begins from a decline in productivity due to wasteful methods, &c., agricultural shortage, and the realization by each producer that the monetary stimulus of high prices is not confined to his own product. For remedies he looks to a certain degree of combination; to greater information, especially as to stocks; to improved banking; to a reform of the currency as recommended by Professor Fisher; to increasing consumption during depression by making for stock, by discriminatory prices, or by national constructional works.

Twelve charts conclude the volume. Each is a statistical atrocity, and Mr. Robertson would be well advised to re-issue them in an intelligible form. Chart VI is a real nightmare, and it is doubtful whether it is the worst. Eight separate curves, the lines of which are indistinguishable, zig-zag up and down the page and cross and re-cross each other in a perfect maze. The eye aches and the brain reels in the attempt to disentangle them. They are all perfectly hopeless. H.W.M.

6.—*International Finance.* By Hartley Withers. viii + 185 pp., 8vo. London: Smith, Elder and Co., 1916. Price 3*s.* 6*d.* net.

Mr. Withers tells us in his Preface that this book was written in response to a request from the Council for the Study of International

Relations that he would explain "what the City really does, why it "is the centre of the world's Money Market," &c., and that consequently it overlaps to some extent part of his previous work. The first three chapters, "Capital and its Reward," "Banking "Machinery," and "Investments and Securities," contain elementary matter which calls for little remark, with the exception of p. 20, where Mr. Withers speaks of the desirability of the workers securing for themselves "an ever-increasing share of the profit of industry" without making it clear whether he means by the ambiguous "share" a proportion of the whole or only an absolute amount or even an absolute amount per worker. If he means proportion, we should welcome some demonstration of the doctrine that plentifulness of capital tends to reduce the proportion of the income of the community going to property: that it tends to lower interest is obvious, but it has yet to be proved that in practice the greater amount of the property on which interest is received does not counterbalance the lower rate of interest so strongly as to give the owners of property a larger proportion of the total income. If he only means that the workers will get better earnings, it would be well to avoid the word "share," and to recognize that few labour advocates, however much increase in absolute earnings there may be, will be satisfied with a world in which labour is either to go on getting, say, two-thirds or thereabouts of the produce as at present, or to get even less.

In chapter IV we are told why money goes abroad, and in chapters V and VI the merits and demerits of the resulting international finance are discussed. While severe enough upon the seamy side—the issue of what I may call insecurities—the author passes on the whole a favourable verdict on international finance and financiers. The thing opens up the world, the men are honest and have nothing to gain by war: in some instances in which it has been supposed that financiers caused war, the truth has been that diplomatists used financial interest as a cloak for ends of their own.

The chapters are all luminous and interesting: as a writer, Mr. Withers is himself throughout. But it is the last two, on "Nationalism and Finance," and "Remedies and Regulations," that best bring out his peculiar position as an economist, or, perhaps I should say, as a moralist who happens to be able to write about economics better than any but a few economists. He has no real feeling for economic goods. True he quotes from Cobbett *On Gold*: "National prosperity shows itself . . . in the plentiful meal, the "comfortable dwelling, the decent furniture and dress, the healthy "and happy countenances, and the good morals of the labouring "classes of the people," a proposition in which economic goods certainly take the first place. But immediately above this quotation he says himself, "At least the war is teaching us that the wealth of a "nation is not a pile of commodities to be frittered away in vulgar "ostentation and self-indulgence, but the number of its citizens who "are able and ready to play the man as workers and fighters when a "time of trial comes." According to this definition the Soudanese under the Mahdi must have been one of the wealthiest nations ever known: the highest wealth would be attained by the world when every man in each nation was readiest to fight and every woman readiest to make munitions—and possibly every baby readiest not to cry if it failed to get its mother's or other milk. This may be morals of a sort: it is certainly not economics. But Mr. Withers allows his morality to colour his economics when he expects the "regeneration" effected by the war to start this country—and presumably the other allied and enemy countries, which are generally understood to be undergoing even greater "regeneration" than ourselves—on an accelerated career of prosperity. The actual destruction of capital he regards as trifling: the cessation of the creation of capital leaves the world no poorer than before (no account being taken of increase of population, which requires something like one per cent. per annum increase of capital to keep things level): munition factories and the skill and habits of industry learnt in them will be utilized: national debt contracted within a country makes a nation no poorer, so that (this is not said explicitly) the United Kingdom and Germany will not be much affected by their debts, but our Allies who have borrowed from us (though their borrowing was as justifiable as that of a man borrowing to pay for an operation to save his life, p. 174) will be "inevitably in the same position as a "spendthrift individual who has pledged his income for an advance "and spent it on riotous living." Experience is not appealed to, though Cobbett's *Rural Rides* might have suggested some apposite reflexions, especially on the social effects of the creation of an enormous fictitious property in war-loans, mortgaged on the taxation of a country, after the period of inflation in which they were contracted has passed away. We are "to show that we can still make and save "capital faster than ever," although "it seems to be probable" that the war will end in a way which will make "other such wars quite "possible when we have all recovered from the exhaustion and disgust "produced by the present one," so that we shall all have to begin paying for the preparations necessary, on the scale suggested by the present war, for the new "regeneration" to be given us by the next.

E.C.

7.—*Le Budget et le Déficit.* By Pierre Baudin, Senateur. 2^e édit. vi + 248 pp., 8vo. Paris: Librairie Félix Alcan, 1916. Price 3 fr. 50 c.

This work was first published in 1910 at the time when French budgetary finance was becoming obviously embarrassed. A second edition now appears, to which the versatile author contributes a new preface—a foreword in the mood of a prophet who has seen his fears realized, and wishes to bring home to his nation her shortcomings—an eloquent summary of the characteristics of the German spirit imbued with the idea of imposing itself and its methods upon the entire world: "elle s'insinue dans l'intimité des nations, "elle a une faculté d'empoisonnement et de verminosité dont on ne "peut apercevoir encore l'épuisement." He appeals from the German faculty for organization, and the singularly methodical discipline of their industrial methods, to his own nation that France may apply herself to settled programmes and progressive ideas, and free herself from obsolete official forms and the "ruinous dogmas" that dominate her financial methods.

Although the book is in some senses a political polemic, it has permanent value to the student of national finance. It may appear fruitless to discuss in detail the course of a stream which once ran in a valley now flooded into a great sea, and the relatively small considerations that seemed important before the present overwhelming financial upheaval may be beyond our immediate attention. But as an essential preliminary to the war finance, and as a striking illustration of certain features of financial principles which have been adopted by a great nation, the detail of French budgets prior to the war will remain of standing interest. There are features in it that should serve the student of financial statesmanship as examples of particular practices, long after they have ceased to be of real importance in France itself. This work is a simple and clear account of many such object lessons.

The author speaks first of the embarrassment that in 1910 was actual and by no means temporary, leading rapidly to a crisis in which, before new sources of taxation were tapped, the need for overhauling financial methods was most obvious. The French budget statements and finance accounts seem to give a maximum of detail and a minimum of real information—no one can ascertain the value of capital stocks, the extent of interest obligations, the provision for sinking funds, or compare receipts with expenditure in any particular branch or undertaking, or in any sense find if the nation is getting value for money. The first essential he regards as the "consolidation" of the deficit, and he shows that from 1872 to 1908 military and education charges suffice almost alone to account for the increase in the budgets, while the increase in the yield from taxation in forty years is due rather to the development of wealth and resources than to increases in the taxes themselves, and those resources properly utilized would be adequate for the growing needs of the state. The most difficult part of the book is the description of the operations of the Treasury, and the floating debt in relation to it—a subject which for many is "wrapt in mystery," owing to the complication and obscurity of the official accounts—and M. Baudin's description is worth close study. The increase in the deficiencies which have served to swell the floating debt arises from the fact that any budget surpluses have generally gone to pay for special charges outside the scope of the budget rather than to serve as compensation for deficits. From 1886 to 1898, 11 years of deficits aggregated to 613 million francs, but 12 years of surplus totalled 816 millions, so that a real surplus could have been utilized for other expenses or for debt redemption. As a matter of fact, only 175 million francs of surplus were really applied to meet deficits.

Even so, the budget has been far from inclusive of all the expenses that ought to be debited, and the *real* deficit is far larger than the apparent and acknowledged one. This arises from the fact that many urgently required renewals and replacements are subjected to ruinous postponement, leading often to a loss of realized or half-completed capital values. The moral and national obligations undischarged, if valued, would, he alleges, greatly swell the deficit. One of his examples is specially interesting: the "camp "d'instruction" is, by general consent, the only efficient school of military education, and there are ten of them counting smaller ones unsuitable for manœuvres—it is ridiculous, and worse, that not one of them should be provided with "installations d'abri, de tir, de terre "battue," with which the German camps are provided. This he follows with complaint about the provision for air service and dirigibles: "Or, on a exposé au Parlement et au pays l'extraordi-"naire organisation de l'Allemagne"—not the only warning as to German preparedness which this voice from 1910 has uttered. There was not only a failure to contribute to new expenditure, but also wasteful cost of upkeep of obsolete forms that ought to have been abandoned. He concludes that the 1910 budget is short by at least 100 million francs for specific expenditure, with much larger additions for other obligations. The general lesson is that French financial policy has been dominated by two worn-out dogmas which are the cause of all the disorder and obscurity of the budget: the principles of "unity" and, for want of a better equivalent, "annuality." These principles have been very useful in their way, but are now a tyranny. Budget unity is the rule which requires that the budget shall contain all the receipts and expenses of the State, authorized for the year, in such a manner that a simple subtraction of one total from the other reveals surplus or deficit, while "annuality" is the rule by which all expenses appearing must be those authorized to be incurred in and for the particular year. These appear to us salutary enough, but when there are large national industries, and long-period programmes, the author makes their limitations in practice very clear. It is essential that the receipts and charges for a business undertaking (including capital commitments) shall be set against one another in order that the real commercial result may be clear, and also in order that the actual general service costs and taxation receipts may be uncomplicated by them. Many examples are given to show how impossible it is to exercise a real control over such industrial ventures, to prevent abuses, to correct and obviate unprofitable extensions and management, and generally to obtain a proper commercial oversight upon a business basis, of concerns that should strengthen and not weaken the national finance, and that should be autonomous financially. Then as regards capital expenditure requiring foresight, he urges that programmes are voted and undertaken, but not carried through, because they are subjected to the annual whims and exigencies of the parliamentary situation, and therein is the profound cause of the muddle of the system of interior navigation, of ports, and of the marine. Again and again, the German comparison is invoked, and many examples are given of good resolutions broken. So the essential reforms are to be autonomous budgets for industrial services, and the suppression of annual votes for compartments of the budget which relate to the carrying out of "programme laws," with a consequential simplicity in the rest of the budget. When every allowance has been made for any exaggeration by a party writer, it would be a bold thing to say that M. Baudin has not fully made out his case. J.C.S.

8.—*Foreign Exchange and Foreign Bills, in Theory and in Practice.* By Wm. F. Spalding. xii + 215 pp., 8vo. London: Sir Isaac Pitman and Sons, 1915. Price 5*s*. net.

Concerning Foreign Exchange and Foreign Bills in Practice Mr. W. F. Spalding is well qualified to write since he has actual practical experience of the working of the business. Students and economists who are sufficiently interested, and well versed, in the subject to grope their way through his rather confused arrangement and to understand the many obscurities involved by his treatment of his problem will be well rewarded by the light that he throws on technical details such as letters of credit and the various wheels in the machinery of exchange. But it is not a book for a beginner, for Mr. Spalding, knowing all about his subject from daily familiarity with its actual working, suffers from ignorance of the difficulties of it as they present themselves to the outside inquirer. He has not yet acquired the art of making the obscurities of exchange clear to the ignorant, because his own knowledge blinds him to these obscurities.

When he deals with wider questions of theory and of the causes that lie behind fluctuations in exchange, his explanations lack something in clearness and fulness. For instance, in dealing on page 95 with the effect on the foreign exchanges of the approach of war, he tells us that:—

"The foreign exchanges all along had indicated the drain of "funds and the real gravity of affairs on the Continent was shown "by the rates current on July 28 (1914). Paris cheque, for instance, "was quoted 25 f. 11 c.–12 c.; Brussels, 25 f. 28 c.–30 c.; Berlin "sight 20 m. 53–55 pf.; Vienna sight, 24 kr. 30–40 h.; Amsterdam, "12 fl. 14½–15½ c.; while New York wired 'Cable transfers, "'$4.90–4.93.'"

What is meant by the foreign exchanges "indicating the drain of "funds"? To a beginner the phrase would be confusing and to an expert it might well present difficulties. Most people would be inclined to guess that, as the book is written from an English point of view, exchanges were adverse and threatening a drain of gold from London; and it is true that a drain of gold from London was taking place. But, as a matter of fact, the rates of exchange quoted in Mr. Spalding's passage were, with the exception of the Paris rate, in London's favour, and if gold was going to any of these centres except Paris, it was going in spite of the exchanges, which might have been bringing it into London if considerations of exchange had been allowed to have free play. But as is well known, even in normal times gold sometimes moves in the teeth of the exchange, and in the crisis before the war the scramble for gold was so keen that all questions of its cost were thrown to the winds.

Nevertheless, when all allowance has been made for the shortcomings of the book, there is still a mass of information in it which, as far as we are aware, is not available elsewhere in print.

H.W.

9.—*Elements of Foreign Exchange: a Foreign Exchange Primer.* By Franklin Escher, Special Lecturer on Foreign Exchange at New York University. Fifth Edition. 160 pp., 8vo. London: Effingham Wilson, 1915. Price 4*s.* net.

Mr. Franklin Escher's primer of exchange well deserves the success that is marked by the appearance of its fifth edition, for it is clear and readable, and throws real light on a difficult subject. He takes the student through the elements of the matter by easy stages into its obscurities, enabling him to see the various causes that create a supply of bills and stimulate a demand for them, the mechanisms of dealings in them, the manner in which gold points work in normal times, if and when artificial restrictions allow them to work, and the ingenious machinery by which the creation of finance bills makes a supply when bills are wanted, and afterwards produces a demand when bills are plentiful. The book is written entirely from the American point of view but is full of information for British readers. It wants a new chapter, dealing with the new problems that America's dramatic entry into international finance since the war has produced. It also wants an index. H.W.

10.—*International Trade: A Study of the Economic Advantages of Commerce.* By Harry Gunnison Brown. xii + 193 pp., 8vo. New York: The Macmillan Co., 1915. Price 4*s.* net.

How many yards of Irish linen exchange for x bushels of Canadian wheat? Indeed, why do any yards exchange for any bushels? Mr. Brown answers the second question, and then proceeds to a discussion of all the possible solutions of the first, when the conditions of production and sale are varied, and not omitting the complication that would be introduced if one or both countries possessed inconvertible paper currencies. Students of economics will at once see that we have before us an academic treatise on the theory of international trade, and they will not expect to find in it accounts and statistics of the actual production and trade of different countries. Why not? Why always imaginary yards of linen exchanging for imaginary bushels of wheat?

A large part of the book consists in an examination of the policy of protection, and while the author admits that in certain conditions there are possibilities of benefit to the protectionist country, yet he contends that these conditions are unlikely to be realised in practice, and hence the chances of a net economic gain are very remote. His judgment on the policy of bounties, and on State encouragement of transport services, is hardly less unfavourable.

Although an American writer, he by no means approves America's trade policy.

In the United Kingdom at the present time the economic arguments for protection appear to be taking a minor place, and emphasis is being laid on the political or military arguments. National, or rather Imperial, self-sufficiency is urged as the only sure defence against Germany in the future, especially in view of the sinister aims believed to underlie her trade policy in the past. One does not expect this aspect of Protection to be analysed in all its bearings in an economic treatise, perhaps least of all in an American one, but considering the importance it is assuming one would like to see it dealt with rather more fully than in the book under review.

Mr. Brown's treatment of the general theory of international trade, and of State interference therewith, is clear and concise, and the book may prove a strong competitor to Professor Bastable's treatise on the same subject. A.D.W.

11.—I. *The Handicap of British Trade, with special regard to East Africa.* By W. H. Hooker. With a foreword by Charles E. Musgrave. xi + 143 pp., 8vo. London: John Murray, 1916. Price 2*s.* 6*d.* net.

II. *Notre commerce d'exportation avant, pendant, et après la guerre.* Par Adolphe Landry. 243 pp., 8vo. Paris: H. Dunod et E. Pinat, 1916. Price 4 fr. 50.

Mr. Hooker and M. Landry have a common aim, to extend the export trade of their respective countries, largely at the expense of Germany, but the scope of their books, and their method of treatment, are very different.

I. Much is being written on trade during and after the war. A good deal of this is to advance pet doctrines entertained by the writers, and the suggested means of improvement are frequently on the grand scale—scientific tariffs, State ownership of railways and steamships, State establishment of "vital" industries. Discussion of all such topics is desirable in every way, but it is also well that we should occasionally hear the person who has no theories or State policies to advance, but who can show that the wheels of commerce might run better if a piece of grit were removed here, and a drop of oil added there. We regard Mr. Hooker as fulfilling this function.

He is an exporter who feels very keenly the restrictions and difficulties under which external trade is at present carried on. He is anxious that we should get a good share of the former export trade of Germany, which is, or rather was—the United States of America, Holland, and other countries are already annexing it—going begging. But in his efforts to secure a personal share in this trade, or even to keep his pre-war business going, Mr. Hooker finds himself hampered at all points. The war is, of course, responsible for many of the difficulties, but public authorities, manufacturers, shipowners, and exporters themselves, all come in for blame. The manufacturer frequently imposes very onerous terms of business, disclaims responsibility for the carriage of his goods to the ship, is careless in invoicing his goods, and unenterprising in cataloguing them. The shipowner is not obliging enough in what he will carry, and often shuts out British goods while accepting foreign. The exporters are lacking in combination and mutual helpfulness. Of course, there are exceptions. The Government's contraband regulations and export licensing system are declared to be harassing and vexatious, and the requirements of the Customs Department and other authorities too exacting. (Mr. Hooker questions the legality of the Customs practice of fining exporters for errors in specifications. But what the Customs do is to mitigate a much heavier penalty to which the exporter renders himself liable under the Customs laws.)

We doubt whether Mr. Hooker has made out a good case against the Government Departments. After all, they have to watch closely an export trade (besides an import trade) aggregating some five hundred millions sterling in a year, and involving the scrutiny of millions of documents, and it is not often an easy or practicable thing to delegate power to relax, in matters of apparently small consequence, a rule or requirement designed for larger purposes. The Departments have no desire to throttle our export trade, rather the reverse, but they are responsible for seeing that this trade does not run counter to the Government's war policy, even if it means holding up the export of a fiddle string. This argument may not appease Mr. Hooker, but we think it must be held to excuse many things that may appear to be harsh or unnecessary to individual exporters.

The shipowners and manufacturers also, no doubt, could say something in defence of themselves. But Mr. Hooker makes a large number of good points, and is ever ready to suggest a way of reform or amelioration, frequently by reference to Germany's methods of doing business. He sums up much that is true in the sentence: "The Germans make business, while we expect it to come "to us" (p. 62). German civility and British indifference, to put it no worse, are well illustrated in the author's story of the export of two launches (p. 63). The entertaining chapter about British manufacturers' catalogues, invoices, &c., is sound sense, and emphasises what many a consul abroad has written. The whole book, in fact, deserves consideration by those interested or concerned in the subject-matter.

II. M. Landry's book is one of a series designed to impart knowledge and ideas on current questions of the day, and the particular subject discussed in this book is the export trade of France and its future prospects. The author's survey is wider and more general than Mr. Hooker's, and his suggestions often involve questions of policy. In some respects the indictment he brings against the French manufacturer and merchant is the same as that brought by other persons against the British. For example, M. Landry deplores lack of initiative among his compatriots, and failure or refusal on their part to adapt their wares to the local tastes of the oversea markets which they seek to supply.

Germany, the arch-enemy, is constantly cited as an example to copy, and as the country whose trade must be captured. German trade and French trade before the war were largely competitive, *e.g.*, coal, iron, machinery, paper, glassware, were important exports of both. On the other hand, British, and to a less extent United States, trade is said to be largely complementary to the French, *e.g.*, foodstuffs are a considerable item among French exports, but are of much less importance in the British export trade. Raw materials and partly manufactured articles enter largely into the latter, while finished articles, especially articles of luxury, fill a large place in the French exports. We are afraid that this view of French and British exports is tinged with the desire to avoid revealing any cause of rivalry between the two countries, but such rivalry in trade surely exists, and is likely to grow, especially if both countries are out to capture German trade. But however this may be, M. Landry directs attention mainly to the competition of Germany. He contemplates a renewal of trade relations with Austria-Hungary and Turkey, partly because their competition is not feared, partly because the antagonism to them is feeble compared with that felt towards Germany.

The greatest interest of the book lies in the author's statement of the difficulties that will confront France in her efforts to build up again and enlarge her export trade, and his suggestions for securing the end in view. Germany at the close of the war will find her means of manufacture largely intact, and will possess a stock of goods for exportation, produced during the war. (Great play has been made in our own country with this alleged stock of goods in Germany all ready to flood the markets of the world on the conclusion of peace, but so far no proof of its existence seems to have been adduced.) France, on the other hand, will be handicapped by the exhaustion of her pre-war stocks of goods, except perhaps certain articles of luxury; by the destruction of some of her means of production—factories will be ruined, labour reduced in amount and partly disabled, many of her leaders in industry killed, raw materials lacking; and by the insistent demands of the home market, which will tend to absorb the available activities of the country.

But there is no cause for despair if France bestirs herself, and begins to prepare now for the coming commercial struggle. Among the many suggestions discussed by M. Landry are the establishment of free trade zones, the simplification of bonded warehouse regulations, through transport rates, the establishment of direct lines of French steamships with Russia and certain other countries, the improvement and extension of credit facilities for exporters, including the foundation of special "banks" for their assistance, the functions of which are to be much wider than those associated with banks in this country. The State's part is a Minister of Commerce holding high office, and endowed with ample powers for co-ordinating work now performed by various public departments, and for fostering the export trade.

The question of tariffs and Customs regulations is very briefly noticed. The desirability is urged of reciprocal concessions between

France and Russia, but we do not read of any intention to modify the French Customs in favour of the United Kingdom.

The book is evidence of the widespread interest being taken in questions of trade, and will provide the French politician with plenty of matter for discussion.

A.D.W.

12.—*Law and Order in Industry; Five Years' Experience.* By Julius Henry Cohen. xviii + 292 pp., 8vo. New York: The Macmillan Co., 1916. Price 6*s.* 6*d.* net.

In 1910 there were 1,696 collective agreements in Great Britain involving 2,400,000 persons; in the same year there was established the principle of collective bargaining in the cloak and suit industry of New York, and the story of its working is the theme of this book. One's first reflection is that America's claim to be the leading industrial country and the home of liberty and comfort and all the rest of it seems to consist mainly in stumbling along at an immodest distance behind Great Britain. The second is that Dr. Dana Durand's protest (in his recent book on *The Trust Problem*) that the United States have not yet made a full trial of competition is singularly ill-timed. In the garment industry of New York anarchy ruled among the employers, anarchy and violence among the employees. The year 1907 saw a bitter strike because a factory owner altered the dinner-hour of his "hands" in order to prevent the women from thronging Fifth Avenue and interfering with the comfort of the lady customers of the department stores. In 1910 there was a bitter strike in the cloak and suit industry for the "closed" or "union" shop, involving nearly 60,000 people. The union ultimately withdrew their claim, and the best of the employers being sick of anarchy and warfare, a "Protocol Agreement" of peace was signed on September 2. "By this document there was created a Board of Arbitration, "consisting of the appointee of both sides and a third person chosen "by both, a Board of Sanitary Control made up of representatives "of the employers, workers, and the public, and a Board of Grievances "made up of representatives of both sides."

The Board of Sanitary Control was most successful, although State and local inspection had broken down. "Under the "jurisdiction created by the few lines in the Protocol, this institution "had raised the sanitary standing of the entire city, affecting the "health and lives of not less than eighty thousand workers, had "established a system of regular fire-drills, a system of careful medical "examination for the workers who applied for it, had created a "Sick Benefit Fund, had worked out measures for fire protection, "first aid to the injured, had studied a plan for insurance against "tuberculosis and other infectious diseases, and had given instruction "in hygiene to the workers themselves." Voluntary effort, in fact, came to the rescue of a broken-down government. The Board of Grievances dealt with shop questions, and followed the Lancashire plan of enquiring by "clerks" or official representatives of both sides, who had power to adjust disputes with an ultimate appeal to the Board. In two years 97·7 per cent. of the disputes were settled by the clerks and 179 or 2·3 per cent. went to the Board of Grievances, only 20 of these being referred to the Board of Arbitration. In four and a half years about 16,000 cases were decided by the two Boards.

Troubles arose in 1913 owing to the competition of the large manufacturer and the small shop and the failure to bring about equality of standards between the two. This created an anti-Protocol party among the manufacturers. Worse trouble came in 1915. The basis of the Protocol was that it established standard minimum weekly scales of wages and that the employers cordially recognized the union and undertook to give preference to unionists. Now after overpraise came disappointment, extremists in the union proclaimed the class-war, and a violent quarrel broke out over the alleged discharge of unionists. There were shop strikes contrary to the Protocol, and ultimately the agreement was denounced by the employers. A reversion to anarchy was unthinkable, arbitration was agreed on, and the Mayor's Council of Conciliation was set up. It decided that the employer must under present conditions be "free and unhampered in the performance of the administrative "functions which belong to him," including the selection of his employees, the dismissal of the incompetent, insubordinate, or unfit, the *bonâ fide* reorganization of his shop, and the assignment of superior work to more skilled workers; the distribution of work in slack seasons was commendable but did not constitute the right to a job, and the fluctuations of employment were to be removed as far as possible "by means of earnest efforts to regularize "employment and by such increase of wages as will secure an average "adequate for the maintenance of a decent standard of living "throughout the year." Sundry improvements in organization were made and the Protocol was renewed for two years.

Mr. Cohen says that employers accept collective bargaining "in theory and in principle. What they want to know is how to "run business by it." Well, we have largely learned that in Great Britain. What has to be learned in America is, says Mr. Cohen, that anarchy must cease—anarchy "indicative of an insidious and "dangerous moral disorder running through the whole of American "life. It is, indeed, the hypocritical homage to a law which the "American democracy does not intend to obey except when "convenient." The practical trouble is the impossibility of competing against unscrupulous employers who maintain lower standards outside the employers' association. Mr. Cohen believes that ultimately there will have to be a Federal law imposing the conditions of voluntary agreements "upon the unscrupulous and "illegitimate minority employer"—a development which has found much support in this country also.

This is a most useful and instructive book, written with detailed knowledge, for Mr. Cohen was counsel to the employers' association and one of the chief builders of a treaty of peace which has been copied in several other American industries. He has appended transcripts of the Protocol and other chief documents illustrative of the working of the scheme. With his own account they make a wonderful story of the progress out of anarchy to regulation and freedom. H.W.M.

13.—*The Authentic History of the United States Steel Corporation.* By Arundel Cotter. x + 231 pp., 8vo. New York: The Moody Magazine and Book Co., 1916.

Government investigations, magazine articles, professional exegetics, stump orator denunciations have now swelled the literature of the Steel Trust to a vast bulk. From the uttermost ore quarry on the Mesaba to the export agencies from Korea to Roumania, everything has been investigated, probed, depicted and described. A collection of the photographs that have been published would furnish a large gallery, and if one set out to "grangerize" the Bureau of Corporations' Reports in the manner of by-gone book-collectors their modest volumes would soon swell to gargantuan proportions. One aspect of the Billion-Dollar Trust has, however, up to now escaped full attention, and Mr. Cotter, thrilled by listening to the testimony given in the suit brought by the United States Government for the dissolution of the Corporation, was inspired to remedy this defect. We all have heard of the "uplift movement" in the United States, which shamed us dull Europeans with our unobtrusive ways of doing things, our simple regard for treaties and principles, our inability to make a new heaven out of a crêche or a new earth out of some psychologically efficient system of nigger-driving. Few of us nevertheless have guessed that the United States Steel Corporation was an integral part of this movement, a concrete example of its blessings, a veritable Herald of the Golden Age. Yet so it is.

In the old bad days before 1901 when Andrew Carnegie was Steel King and steel was "either Prince or pauper," competition was ruthless and Andrew was pitiless. "Steel makers resorted to "every means that offered to divert orders from competitors to "themselves. It was a case of dog eat dog." Pool followed pool to limit competition, but "it is doubtful if a single pool agreement, "and their number was infinite, was ever honestly kept. Old steel-"makers chuckle to-day as they relate how each representative "of a company taking part in a pool sought to gain an advantage "over his competitors while the pool was yet a-borning" (Mr. Cotter has plenty of words like this; "worriment" is another). Indeed, one would not be surprised if Mr. Cotter had read with approval that somewhat malicious volume on *The Carnegie Millions* by Mr. James H. Bridge. Then arose Mr. Elbert H. Gary of the Federal and Illinois Steel Companies with a new idea. "Where "Carnegie sought to unify the control of the steel trade and bring "it into his own hands, Gary sought to make it an industry owned by "the people, and particularly by the workers." But J. P. Morgan would not find the money for a development of the Federal on these lines, and he was equally unwilling to listen to Carnegie when he wanted to sell out. Carnegie threatened war on the Morgan interests, but peace came, as it frequently does among men of the Anglo-Saxon race, through a dinner. Morgan was invited to a dinner on December 12, 1900, and " Charlie " Schwab, the super-salesman, who " could " talk the legs off the proverbial brass pot," was " let loose " on the financier. The king of money succumbed to the king of words, either through exhaustion or because he was convinced. Mr. Cotter thinks it was the latter. " Morgan saw before him unlimited " possibilities not for money-making alone—for this was by no means " the ruling passion of his being—but of creating an industry that " should leave an indelible impress for good on industrial history, a " business so great that its actions could not fail to force themselves " upon the attention of the world and to command imitation on the " part of other industries. A business, moreover, so powerful that it " could not need to resort to the dubious practices of the old days to " succeed."

When Judge Gary came to a commanding position in the Corporation his policy was that of " dealing fairly and decently with " competitors, as being the only way in which any kind of stability " of prices or conditions could be maintained, . . . keeping " them informed, as far as he legitimately could, of all the conditions " of the Steel Corporation." This policy, which is by no means as novel as Mr. Cotter thinks, culminated in the famous Gary dinners of 1907-9. The dissolution suit of 1912–15 resulted in a decision that the Corporation was not a monopoly, did not act in restraint of trade, did not indulge in unfair competition. The great growth of the independent companies showed, in fact, that the United States market was growing so rapidly that it was easier for new businesses run by men with fresh energies to occupy the field than for a gigantic Corporation like the Steel Trust to expand with sufficient rapidity. Indeed, we may question whether the interdependence of the Corporation with so many other interests—Morgan, Rockefeller, &c.—was not a real hindrance. So many effects had to be considered, the ultimate bearings of policies on the " Money Trust," the " Oil " Trust," were often so doubtful, that one would expect that its own money weight was a disadvantage to the Corporation as against a smaller concern whose relations were simpler and position freer. If, as Judges Woolley and Hunt thought, the object of the organizers was to restrain trade, it failed. All parties appear to have assumed that stable prices of which competitors and immediate customers did not complain were necessarily meritorious, thus begging the question whether they were equally advantageous to the community. Stability is a good thing, but it is only one consideration out of many, and the subject requires much more consideration than has been given to it or than we can give to it here. Before passing away from these legal proceedings it is interesting to note that Mr. Cotter accepts as well founded the Bureau of Corporations' charges against the Steel Corporation on account of their over-capitalization and the conditions and purpose of the Hill ore lease.

"Other marked attributes of Judge Gary are his intense desire "for justice to all and his sincere interest in the well-being of the "worker," and he has been rewarded by "one universal sentiment of "loyalty, of personal interest in the fortunes of the big company, and "the will on the part of each man to give the best in him for the "general result." The cause of this idyllic state of things is that the chief officers all began at the bottom and that anyone now at the bottom feels that he may rise to the top. In the second place the Corporation allow all employees to buy every year a certain amount of stock at a little below the market price and pay them a bonus dividend, while the men who occupy "official and semi-official "positions" have a share in the profits. Up to the end of 1914 a total of 505,957 shares were subscribed for and in December of that year 42,300 employees were interested in the plan. Mr. Cotter thinks that this is a plan of almost supernal wisdom, but one hesitates to think how long ago it was that profit-sharing was to re-create British industry; it dates, or almost ante-dates, one so. And when we turn over a chapter or two we find that Mr. Cotter holds that "unionism is opposed to efficiency. It destroys the *esprit de corps* "that is so important in getting the best results from a large body of "men. In its very essence it is antagonistic to the employer." So perhaps the wisdom was the wisdom of the serpent! More meritorious is it that since 1901 wages have risen 27 per cent., and that on only one occasion have wages been reduced. The provisions for safety, sanitation, and welfare are also deserving of study, and though they are the subject of more trumpeting than British manufacturers are wont to indulge in, there is little doubt that we can find something to copy.

Mr. Gary's idea was to have a "Republic of Steel," owned by a democracy. It is a notion as old as the joint-stock company. At the end of 1915 there were 52,785 common stockholders and 85,561 preferred stockholders. We wonder how much influence they exerted on the policy of the Corporation.

Mr. Cotter's book is a panegyric on the United States Steel Corporation and especially on Judge Gary. Like all official accounts, it will be heartily disbelieved, but nevertheless there is much in it which deserves attention, particularly the chapter on the Corporation and the export trade. H.W.M.

14.—*Agriculture after the War.* By A. D. Hall, F.R.S. vi + 137 pp., small 8vo. London: John Murray, 1916. Price 3*s.* 6*d.* net.

In this little book an expert official offers, in compact and complete form, the case for the "reorganization of agriculture" laid piecemeal before Departmental Committees. His text, according to his Preface, is "the need for an increased production of food at home, and the "greater employment of men upon the land, as essential to the security "of the Nation as a whole." In the final chapter, where the argument is summarized, we discover the declaration that Mr. Hall has "no party" or "separate interest to promote," and the assertion that he has "come to know the face" of his "own country "as few men have been privileged to do." No one, we are sure, who has appreciated his earlier writing will impugn his title, thus affirmed, to the influence that the considered view of a recognized authority, backed by rare intimacy with the whole agricultural area of Great Britain, must have with impartial witnesses. Nor will any reader, whether concerned or detached, of his present plea for change fail to admire the lucidity, reinforced by facts and figures, with which the reasoning is expressed, or to acknowledge the bold honesty that prompts the distribution, without fear or favour, of praise and blame in various quarters. They will congratulate Mr. Hall upon the courage with which he faces the conclusions, startling or disconcerting as they may be, of his arguments.

An author who maintains that "for the last generation the "cultivation of the land has been declining," who holds that, "compared with the industrialized" large farm, the "small-holding "colony will be a less efficient and more expensive producer," and is "indifferently adapted to farming for wheat and the other staple "crops, and to the breeding and fattening of cattle and sheep," who, "speaking generally," describes English farmers as insufficiently "educated and short of capital for the business they have in hand," who argues that there is an "urgent call for the special" training of our rising generation of landlords, because the "landowner, if he "is to retain his position, must become the leader of his tenants "and the entrepreneur of his property," who admits the necessity of raising the wages of the labourer as, "except in certain districts," he "is the worst paid workman in the country," who contends that the State "cannot leave agriculture to the unrestricted play of "foreign competition, but must ensure that the farmers' returns do "not fall below a certain level," although the only method of which he is aware for meeting the objection that bounties or duties may be passed on from farmer to landlord as rent is for the State to "become "the universal landowner and so get back any increment in value "brought about by its own action"—such an author is at any rate freed altogether from the reproach of courting popularity with any class at the cost of candour.

But Mr. Hall is as reasonable as he is outspoken. His actual proposals do not exceed the limits of what can be attained without difficulty in an immediate future. His thesis should be followed seriatim in the text of his book, the small size of which is no indication of its great importance. Here we can attempt only the briefest summary. Mr. Hall argues that the appearance of the submarine has enhanced the danger of the dependence, in the case of wheat, of this country for so large a quota of its food supply on importation from outside; that the increase of wheat production is possible with an improvement in agricultural methods, involving the use in farming of the economy and enterprise associated with large business in manufacturing industry, and the employment, mainly in industrialized big farms, of scientific knowledge and accurate book-keeping; that wheat will not continue to be grown unless a definite prospect of a remunerative price is offered, and that this condition must imply some departure from laissez-faire by the State, whether the bestowal of a bounty be, or be not, preferred to the levy of an import duty, or other means be sought and used of encouraging or requiring the substitution of better wheat for inferior grass. The guaranteeing of the necessary food supply of the nation would offer simultaneously opportunity for the employment of disbanded soldiers or of others on the land, and might advantageously be supplemented by various plans of land reclamation. Such, then, is the attractive programme, and such the effective fashion in which it is supported, of this timely book. It is certainly one of the most practicable of all the suggestions now put forward for the "aftermath" of the war; for it proceeds from a writer who knows exactly what he wants and frankly states the precise means by which his desire can be accomplished. L.L.P.

15.—*Early Economic Conditions and the Development of Agriculture in Minnesota.* By Edward Vandyke Robinson, Ph.D. v + 306 pp., 4to. Minneapolis: The University of Minnesota, 1915.

This considerable volume, with its wealth of graphs, consisting largely of maps, in the text, and an abundance of statistical tables in the appendices, is an "intensive" study of the economic history of a district which contains "one of the greatest wheat-growing "regions in the world." The main interest, accordingly, of Professor Robinson's elaborate monograph may be held to attach to the increasing preponderance, at different stages in the development of the state of Minnesota, of the wheat crop, as compared with other cereals, and with other kinds of agricultural produce and activity. That process, however, as he shows, has undergone interruptions at different epochs, more or less pronounced in their duration or their magnitude; and in the end the evidence of the inevitable emergence of mixed farming, in certain parts at any rate of the area comprised, becomes significant. Unfortunately, he points out, Minnesota, beginning with the publication of "general state "statistics" as "soon as it became a State," and, after a lapse between 1861 and 1868, continuing a second series, with the exception of a single year, for an unbroken period of thirty years from 1868 to 1898, then stopped altogether, "owing apparently to legislative "opposition." The Professor rightly calls attention to the "urgent "need of general State statistics, so arranged as to supplement and unify those issued by the several state departments"; and he notes that, while the gap in the series in Minnesota during the Civil War has made the interpretation of that period "difficult and "fragmentary," the final "decade from 1900 to 1910," in consequence of the entire abandonment of such publication, "took as much time" to understand "as the preceding fifty years," and the "result is less "satisfactory than for any previous decade," except that mentioned above, "since the territorial period." Another difficulty faced was not of a statistical nature ; but it affected the entire scope of the investigation. That was the absence of "mathematically accurate "maps of Minnesota as a whole, showing civil boundaries at different "periods." This serious obstacle, however, was overcome, so far as it was possible, by the special preparation, for this inquiry, of a "general base map of the State," on which "the boundaries at each "census year were laid down according to the best contemporary "maps, checked by reference to the state statutes and the census." "No skilled map-makers," nevertheless, "were available."

The width and thoroughness of the account of the agricultural development of Minnesota, presented in this volume, necessitated the employment of a great variety of accessory material, and the oral or written interrogation of a number of persons commanding actual experience of the facts. A "preliminary survey of "topography, soil and climate," with a conspectus of the "sources "and routes of settlement and transportation especially during the "pre-railroad era," has been placed at the disposal of his readers by the indefatigable industry of the author ; and the census returns, severed by intervals of ten years, have been supplemented where movements ran their course in a shorter time, and the figures needed an explanation to be sought and found outside the bare numerical record. Dr. Robinson has spared no pains in gathering and appraising his material ; and he may, we think, be congratulated upon the completeness of the picture drawn. It will, we anticipate, form a permanent contribution to economic history, for it contains a full descriptive narrative of typical agricultural development which has taken place in an important section of the globe. In the opening chapters the "physical features and climate" of Minnesota, "early travel, trade and transportation" in and to the State, its "settlement" and the development of "pioneer" agriculture from 1838 to 1860, are described. Then followed from 1860 to 1880, a period of "specialized wheat farming," which, in its turn, was succeeded by the development of "diversified farming" in the two decades stretching from 1880 to 1900. Finally, in his sixth and last chapter, Dr. Robinson discusses "recent tendencies" in agriculture. The decline in the acreage in wheat "from 50·69 "per cent. of all tilled land in 1899 to 25·73 per cent. in 1909" cannot, from lack of general State statistics, be satisfactorily studied or exhibited ; but it "meant an agricultural revolution." This, too, was a permanent pronounced movement, unlike the temporary reactions experienced in the earlier period of specialized wheat production ; although at that time three successive "culminations" of wheat growing could be distinguished, occurring in 1870, in 1874 and in 1878 ; and in the subsequent score of years, when diversified farming appeared, there was a reversion to wheat raising, which reached its fulness in 1899. At the close of the survey, however, tenancy was becoming more general than ownership, and the "social "significance" of this particular change could hardly be overrated.

L.L.P.

16.—*Consommation des boissons alcooliques dans les différents pays.* Par Dr. Johannes Gabrielsson. iv + 270 pp., 8vo. Stockholm and Paris: F. Alcan, 1915. Price 8 fr.

This book furnishes a valuable summary of statistics concerning the production and consumption of spirits, wine, and beer, in some fifty countries and a number of colonial possessions, and also an excellent example of the difficulties of making international comparisons. The data are obtained principally from official sources, among which our own Board of Trade's publication, *Alcoholic Beverages*, is given a very high place.

In the first part of the book the author explains his terms, and enumerates many of the causes rendering comparisons between different countries inconclusive or misleading. For example, the figures do not cover the same ground in all countries. In most countries potable spirits only are included in the figures of consumption, but in a few instances denatured spirits are included. Spirits, wine, or beer made for domestic consumption, if not accounted for to the State authorities, are generally excluded, and the quantities thus omitted are sometimes of considerable importance. No allowance can, of course, be made for illicit distillation and consumption, which are said to be considerable in the United States of America. In some minor countries, only statistics of imports and exports are available. Even if the data as to aggregate quantities were complete, comparisons between countries should properly allow for the varying consumption between different classes of the population. For such a country as Switzerland, which is an international holiday resort, the fluctuating population of foreigners should be taken into account. In actual practice, however, it is not possible, owing to lack of information, to make corrections and adjustments for these various disturbing factors.

The figures of spirits for the several countries are converted into their equivalent of spirits containing 50 per cent. of alcohol by volume, and spirits, beer, and wine are further converted into terms of pure alcohol, the factors for conversion being largely derived from official sources.

There is one point that Dr. Gabrielsson has overlooked, which unfortunately introduces a considerable error into some of his figures. He supposes that the quantity of spirits produced is wholly accounted for by the quantity consumed as potable spirits, by the imports and exports, and the quantity denatured or used for industrial purposes. As a matter of fact, a large quantity of spirits is lost by evaporation, absorption into casks, leakage, and in other ways. In the United Kingdom this loss amounts, in recent years, to 4½ or 5 million gallons per year, or 9 per cent. or so of the annual production. Presumably the same sort of loss occurs in other countries, so that the error is a serious one, and expresses itself as an exaggeration of the quantities of spirits used for industrial purposes. Another source of error is the neglect, in most cases, of the variation of stocks in bonded warehouses.

The tables in general relate to the period 1906–10, but some figures are given, and a series of diagrams, covering a much longer period. It will be of great interest in another edition of the book to have recent figures added. There is a rather useless calculation at the end of the text, which gives a result indicative of neither present nor past consumption, but of the position as it would be in the future, if the past rate of change in consumption held good—which in many cases it will not do—and allowing, on an arbitrary basis, for the relative harmful effects on the human system of a given quantity of alcohol consumed in the form of spirits, wine, or beer.

A.D.W.

17.—*The Exemption of Improvements from Taxation in Canada and the United States.* A report by Robert Murray Haig, Ph.D. New York, 1915. *Some Probable Effects of the Exemption of Improvements from Taxation in the City of New York.* Robert Murray Haig, Ph.D. New York, 1915. *Excess Condemnation: a Report of the Committee on Taxation of the City of New York.* With a report prepared by Herbert S. Swan. New York, 1915.

A proposal was introduced in the New York Legislature, in 1915, for apportioning the City Rate on Real Estate between land and improvements in such a way that the assessed value of improvements should be reduced by 10 per cent. in each of eight consecutive years, and by 9 per cent. in the ninth year, and that thereafter only 1 per cent. of the rate charged on land should be levied upon improvements. Mr. Murray Haig appears to have been requested early in 1914 by Professor Edwin R. A. Seligman, Chairman of the Executive Committee of the Committee on Taxation, to supply data illustrating the effects of the proposal, and his two volumes are the result. Mr. Haig proceeded in the first place to investigate the conditions existing in the towns and other areas in Canada where the system of exempting improvements wholly or partially from rates was in force. The principal towns visited were Winnipeg, Regina, Saskatoon, Edmonton, Calgary, Vancouver and Victoria. The cases of Houston, Pueblo, Pittsburg and Everett, four towns in the United States, are also briefly dealt with. The method adopted has been to secure as far as possible for each town statistics of the assessed values of property liable to rating, the tax rates, the number, character and value of buildings erected in recent years, population, bank clearings and postal revenue, with a statement in some cases of municipal finance and indebtedness. The personal opinions of a number of individual citizens are added, but these are not of value to the student.

Winnipeg, it appears, in 1909 reduced the rate on buildings by the device of taking two-thirds of their value as the basis of assessment, while retaining the full value in the case of land. This change was effected without reducing the aggregate rateable assessment, and without any rise in the rate. This was partly due to a steady increase in land values, and partly to the correction of previous under-valuation. Moreover, the rate, which was 15 mills per dollar in 1909, fell to 10·8 mills in 1910 and, though rising subsequently, was only 13 mills in 1913. The effect upon building operations was marked. The expenditure on buildings, which had not previously exceeded $12,626,000 (in 1909) and was under $6,000,000 in 1908, rose in 1910 to $15,000,000, in 1911 to $17,700,000, and in 1912 to $20,500,000. The figures for 1913 were about $18,600,000 and a considerable falling off was shown in 1914, for which the statistics are not complete. This falling off appears to be common to all the large towns of Western Canada in 1914, and is probably due to causes outside the methods adopted for local taxation, as it is found in all the towns visited by Mr. Haig, irrespective of the extent to which improvements are exempted.

In Regina buildings have been assessed at 30 per cent. below their value since 1910. In Saskatoon the assessment of buildings was reduced to 50 per cent. in 1911, 35 per cent. in 1912 and 25 per cent. in 1913. In Edmonton no direct tax has been levied on buildings since 1904, an extreme policy said to be due to the fact that up to 1912 the Hudson's Bay Company held, unsubdivided, an area in the heart of the city, approximately 1½ miles long by 1 mile wide, using the land only as pasturage for a herd of cattle. In Calgary, after frequent changes, the assessment of buildings was fixed at 25 per cent. of their value in 1912.

In British Columbia the exemption of improvements dates further back. In Vancouver buildings were exempted to the extent of 50 per cent. in 1895, and in 1906 the value of improvements rated was reduced to 25 per cent. Since 1909 improvements have been altogether exempt. In Victoria the process commenced in 1892 when only 50 per cent. of the value of improvements was assessed, this being reduced to 25 per cent. in 1894, and increased again to 50 per cent. in 1896. Since 1910, however, improvements have been entirely exempt.

The account given of local taxation in Houston, Texas, during the last five years is especially interesting, in view of the fact that the reduction in the charge on buildings appears to have been made in defiance of the law, but with general consent. In 1914 land in Houston was assessed at 70 per cent. of its true value and improvements 25 per cent.

The outstanding feature of the figures collected by Mr. Haig is the regularity with which a substantial reduction in the rate levied upon buildings is immediately followed by a substantial increase in the number of buildings, and in the amounts expended in constructing them. In the years 1913 and 1914, however, there was a general falling off in all the cities dealt with. This falling off, however, is ascribed by common consent to a general trade depression and appears to be unconnected with local taxation changes. Curiously enough, Mr. Haig draws no definite conclusions from this activity on the part of builders, but contents himself with the cautious statement that the Canadians have ground for their belief that the exemption of improvements stimulates building.

It is claimed by those who support the exemption of improvements that its principal effects will be :—

(1) A stimulus to building ;
(2) An increase in the amount of land in the market ; and
(3) The limitation of land speculation.

Some, indeed, contend that there will be a tendency to increase in the value of land owing to the greater demand created by increased building operations. This contention must, however, be subject to certain obvious limitations. The population of a town cannot make use of more than a certain volume of buildings, and when the supply exceeds the demand no stimulation of building enterprise is likely to increase the number of buildings. The facts in the Western Canadian towns clearly indicate this, for while a reduction in the levy on improvement values has been, as a rule, immediately followed by an increase in building operations, the rate of such increase has seldom been maintained for more than two or three years. Mr. Haig appears to think that the change has not had any material effect upon land speculation. Nevertheless he adduces, as one of the disadvantages of the new system, the fact that arrears of local taxation have in some towns increased considerably owing to the inability of owners of vacant land to pay their rates. This condition of affairs is clearly a lesson to speculators, and when Mr. Haig adds that several towns have refrained from recovering the arrears by means of land sales, the natural conclusion seems to be that there was ample land available for anyone who wished to buy, and that speculation had been at least severely curtailed. This conclusion is probably disguised on the spot by the fact that most of the citizens have been land speculators themselves, and do not sufficiently distinguish between the effects of imprudent purchases of land and those of trade depression.

The most surprising thing about Mr. Haig's work is that, when he comes to investigate the probable effect of the change as proposed to be applied in New York, he ignores the results of his Canadian investigations, and proceeds on a basis at variance with those results. The consequence is that the figures which he has compiled with so much labour for New York are not only valueless, but misleading. He takes the assessable figures of 1914 for land and improvements respectively, and applies to them the rates proposed for the fifth and ninth years after the change indicated in the Bill introduced last year. In other words, he compares the *present* distribution of burden with the results of a system (*a*) exempting 50 per cent. of improvements from charge in 1919, and (*b*) exempting 99 per cent. in 1923. To obtain his results he ignores altogether the great variations in the values, both of land and improvements, which would inevitably result from the changes proposed, and assumes that the values of 1914 would remain unaltered. He has thus made the mistake of presenting groups of figures which *must* be incorrect, instead of using his Canadian experience to indicate the probable tendencies of the change in the way of alterations in value.

It may perhaps be said that the conditions prevailing in the new Canadian towns are so widely different from those of New York that no indication is possible. In regard to exact figures this statement is obviously true; but certain general effects of taxation upon prices are indicated by Mr. Haig himself in his report on Canada; and however much time and local conditions may modify economic results, they cannot destroy the general tendency—clearly evident—that the taxation of land according to its value makes more of it available for use, while the relief of buildings from taxation tends to encourage building.

In New York, apparently, the City Authorities in making street improvements are only empowered to acquire by compulsion such properties as are absolutely required for the making of the new or widened thoroughfare. The result is shown in the Taxation Committee's report by several photographic reproductions of unsightly flanks and edges of buildings along the frontages of important streets. New York is now proposing to follow the example of London and obtain power to purchase land for recoupment and rebuilding as well as for the actual site of the street, and thus obtain substantial control over the development of the new frontages. The New York Committee on Taxation, however, calls the system "Excess Condemnation." Mr. Swan's report is made up almost wholly of information obtained from London and other English Cities principally on questions of cost; and this information is more fully obtainable from public records here. E.J.H.

18.—*Other New Publications.**

Bidwell (*Percy Wells*). Rural Economy in New England at the beginning of the Nineteenth Century. 243–398 pp., 8vo. New Haven, 1916. Price $2.

[This study forms part of a larger work upon which the author is engaged: a history of the changes in the rural economy of New England in the nineteenth century. Such a history falls into three periods. 1. The period of self-sufficient economy; 2. The period of transition to commercial agriculture under the stimulus afforded by the rise of manufacturing enterprises in inland towns and villages, and 3. The period of the decadence of New England agriculture, extending from close of the Civil War to the end of the nineteenth century. This book deals with the agricultural conditions of the country at the close of the first period and is divided into the following chapters:—1. The Inland Towns and their Village Settlements; 2. The Coast and River Towns; 3. Commercial relations of Southern New England with the Southern States and the West Indies; 4. Internal Trade and the Transportation System; 5. The Agricultural Industry; 6. Home and Community Life in the Inland Towns. There are several appendices and a bibliography.]

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* See also "Additions to the Library," page 392, *sqq.*

Brassey (*Earl*). Work and Wages; the reward of labour and the cost of work. Founded on the experiences of the late Mr. Brassey. x + 200 pp., 8vo. London: Longmans, Green and Co., 1916. Price 3*s.* 6*d.* net.

[The above book is a volume of extracts, revised and partially rewritten, from Lord Brassey's "Work and Wages" issued in 1872, and from other publications of the author, and has been compiled as being useful for the guidance of those having to deal with the management of labour. It is divided into the following chapters:—1. Conditions of Labour; 2. Wages and the Cost of Work; 3. Wages Generally; 4. Co-operative Production; 5. Familistère de Guise; 6. Work and Wages in 1877; 7. Labour at Home and Abroad; 8. On the Rise of Wages in the Building Trades of London; 9. Foreign Competition—Comparative Efficiency of English and Foreign Labour.]

Cambridge Industrial and Commercial Series—

Bosworth (*George F.*). Ships, Shipping and Fishing. With some accounts of our seaports and their industries. 86 pp., 8vo. Cambridge: Cambridge University Press, 1915. Price 1*s.* 6*d.*

Dicks (*A. J.*). Trade and Commerce. With some account of our coinage, weights and measures, banks and exchanges. 94 pp., 8vo. Cambridge: Cambridge University Press, 1915. Price 1*s.* 6*d.*

Farrar (*F. A.*). Factories and Great Industries. With some account of trade unions, old age pensions, State insurance, the relief of distress, hospitals. 90 pp., 8vo. Cambridge: Cambridge University Press, 1916. Price 1*s.* 6*d.*

Cohn (*August*). Some Aspects of the War as viewed by Naturalized British Subjects. 24 pp., 8vo. London: Council of the Loyal British Subjects, 1916.

Davies (*E. F.*). The Finances of Great Britain and Germany. 61 pp., sm. 8vo. London: T. Fisher Unwin, 1916. Price 2*d.*

[A further study of the financial condition of the German Empire and of Great Britain in continuation of and supplemental to the author's pamphlet "British and German Finance" issued in March, 1915.]

Fogg (*Lawrence A.*). Bankers' Securities against Advances. A Manual for the use of Bank Officials and Students of Banking Theory and Practice. 115 pp., 8vo. London: Sir Isaac Pitman and Sons, 1916. Price 5*s.* net.

[The author's object is to explain in simple language the theory and practice relating to the various classes of securities handled by bankers. It is intended as a guide to managers, chief clerks and especially the more inexperienced officials.]

Foster (*L. F.*). The Universities and University Colleges of the British Isles and Commercial Education. (Reprint from October, 1915, Educational Administration and Supervision.) 511–526 pp., 8vo. 1916.

Guevara (*L.*). Towards reorganisation of International Finance. 85 pp., 8vo. Bradford, 1916. (Privately printed.)

[An investigation of the different phases of the problems of exchange and suggestions whereby the existing financial machinery may be utilised effectively towards the reorganisation of International Finance. The book is divided into the following sections:—1. The Basis of International Finance; 2. Debasement of Currency; 3. Gold Reserve and Bank Rate; 4. The Dollar Loan in America; 5. The Problem of Exchange; 6. Exports and Imports; 7. The Bill of Exchange; 8. Rate

Guevara (L.)—contd.

of Exchange; 9. Distribution of Proceeds; 10. The Organisation of International Finance. Appendix. The author wishes to establish a permanent basis for rates of exchange in the first place by dissociating currency from rates of exchange, and then by organising supply and demand of bills of exchange.]

Hauser (Henri). Les Méthodes Allemandes d'Expansion Economique. 3e édition. vi + 290 pp., sm. 8vo. Paris: Armand Colin, 1916. Price 3 fr. 50 c.

[The first edition of this book was reviewed in the *Journal* for March, 1916. The present edition has been slightly enlarged and certain corrections made. An unfortunate statement occurred in the first edition on account of which the author and publishers request that copies of that edition be exchanged for the present edition in which the error has been corrected.]

Millioud (Maurice). The Ruling Caste and Frenzied Trade in Germany. 159 pp., 8vo. London: Constable and Co., Ltd. 1916. Price 4*s.* 6*d.* net.

[A translation of the book by Professor Millioud of the University of Lausanne. It is divided into two parts, the first dealing with the composition of the governing classes, their ambitions and aims and the reasons for their power over the masses. The second part, which is entitled "Germany's Aims at Conquest by Trade and by War," attempts to explain the method of action of this caste, and the author thinks the chief causes which led to the war were of an economic nature. It is sub-divided into the following heads:—1. Reasons for Germany's Action; 2. The Ends in View; 3. The Means Employed; 4. Germany's Financial System; 5. The Obstacles in her Path; 6. Why Germany was Alarmed. The Rt. Hon. Sir Frederick Pollock contributes an appreciative introduction.]

Moore (Harold E.). Farm Work for Discharged Soldiers. 31 pp., 8vo. London: P. S. King and Sons, 1916. Price 6*d.* net.

[Proposals for helping disabled or discharged soldiers to secure a livelihood from agricultural work. They are divided into three parts, namely:—1. Farm sanatoria for disabled men; 2. Co-operative hand labour farms; 3. Settlements of small holdings.]

Murray (J. Alan). The Economy of Food. A Popular Treatise on Nutrition, Food and Diet. Popular Edition. xii + 253 pp., 8vo. London: Constable and Co., 1916. Price 2*s.* net.

[This book was first published in March, 1911. The present edition has been issued at a reduced price in order that it may be circulated to an increased extent. It is divided into three sections dealing respectively with:—Nutrition, food, and diet, each of which is again subdivided into several chapters. In view of the necessity for economy in food at the present time, the book should be of much value to the public.]

Peddie (J. Taylor). On the Relation of Imports to Exports. A study of the basis of a new National and Imperial Policy. Second edition (enlarged). xxiv + 148 pp., 8vo. London: Longmans, Green and Co., 1916. Price 5*s.* net.

[The first edition of this book was noticed in the *Journal* for January, 1916. The present edition has been enlarged and contains in addition an essay on "National Economics or Empiricism" setting forth the general conclusions arrived at by the author after writing the previous essays and largely from actual experience.]

Phillips (E. A. W.). British Trade and the Metric System. How to Trade with Metric Countries and with Russia in Ordinary British Units. 112 pp., 8vo. London: Francis Griffiths, 1916. Price 5*s.* net.

[The main object of this book is to show how existing British weights and measures can be used just as they are in metric countries.]

Pigou (*Prof. A. C.*). The Economy and the Finance of the War. Being a Discussion of the real costs of the War and the way in which they should be met. 96 pp., 8vo. London: J. M. Dent and Sons, 1916. Price 1*s.* net.

[After explaining the nature of the net economic costs, as distinguished from the nominal money costs of the war, the book discusses the comparative advantages of different kinds of private economy, the problem of the foreign exchanges and the comparative advantages of taxes and war loans. It ends with a brief discussion of probable economic conditions after the war.]

Plaatje (*Sol. T.*). Native life in South Africa. Before and Since the European War and the Boer Rebellion. 352 pp., 8vo. London: P. S. King and Son, 1916. Price 3*s.* 6*d.* net.

Probst (*Eugen*). Belgien. Eindrücke eines Neutralen. 86 pp. and maps, 8vo. Zurich: Art. Institut Orell Fussli, 1916. Price 2 fr. 50 c.

Reynolds (*Arthur*). Practice in Précis Writing. 241 pp., 8vo. London: Sir Isaac Pitman and Sons, Ltd., 1916. Price 2*s.* 6*d.*

Roberts (*Geo. E.*). Economic Position of the United States at the close of the War. 21 pp., 8vo. December, 1915. New York: The National City Bank of New York.

Robertson (*Right Hon. J. M.*), M.P. Shipping after the War. 39 pp., 8vo. London: Cobden Club, 1916. Price 2*d.*

[An examination of the effects which the suggested amendment of the existing Navigation Laws with a view to the exclusion of German shipping from British ports are likely to have on British trade in general. The difficulties of such a measure are clearly set forth.]

Shelton (*A. W.*). The People's Housing. The effect of the Finance (1909-10) Act, 1910, on the building of Cottages. Second edition. 8 pp., 8vo. London: Co-operative Printing Society, 1916.

[Deals with the influence which the Finance Act, 1910, has had in restricting the building of small property.]

Siegfried (*Dr. Bernhard*). Repetitorium der Schweizerischen Volkswirtschaft. 92 pp., sm. 8vo. Zurich: Art. Institut Orell Fussli, 1916. Price 3 francs.

[A series of lectures grouped as follows:—Einleitung, Die Landwirtschaft, Die Industrie, Handel und Handelspolitik, Verkehr und Verkehrswesen, Geld- Bank- und Borsenwesen, Nachtrag.]

Supino (*Camillo*). Le Fonti Economiche della Guerra. 20 pp., 8vo. Bologna: Nicholas Zanichelli, 1916.

[Reprinted from *Scientia* for March, 1916.]

Wacha (*The Hon. Mr. D. E.*). Agricultural Banks in India. 33 pp., 8vo. Bombay, 1916.

[This pamphlet is a reprint from No. 1 of the *Indian Journal of Economics*, and is a study of the ways and means most practicable for the reduction of agricultural indebtedness so prevalent in India. The author suggests Agricultural Banks on the lines of those established in Egypt, as a remedy.]

White (*J. D.*), M.P. A Scheme for Land-Value Taxation. 16 pp., 8vo. London: P. S. King and Son, 1916. Price 3*d.*

[An endeavour to set out the material features of a practical scheme for placing a national tax on land values, and the general effects of such a scheme.]

Wood (*T. B.*) and *Hopkins* (*F. G.*). Food Economy in War Time. 35 pp., 8vo. Cambridge: The University Press, 1915. Price 6*d*. net.

[In view of the present necessity for economy in food, some guidance is necessary for those wishing to practice economy without injury to health and this pamphlet has been written to meet that want. It is divided into the five following parts: I. Introductory; II.—The Uses of Food (1) as a Source of Power, (2) as Material for Repair (Flesh Forming); III. Table of Food Values and their Cost as bought in different Foodstuffs; IV. Notes on Individual Foodstuffs; V. Food Budgets; and should have a wide circulation.]

Yule (*G. Udny*). An Introduction to the Theory of Statistics. Third edition, revised. xv + 382 pp., 8vo. London: Charles Griffin and Co., Ltd., 1916. Price 10*s*. 6*d*. net.

[The first edition of this book was reviewed in the *Journal* for May, 1911. In the present edition thorough revision has been impossible owing to the pressure of other duties on the author. Such minor alterations and additions as seemed essential have been made, however, and the lists of references brought up to date.]

Norway. Revenus et fortunes d'après les rôles de l'impôt communal dans les districts ruraux du Royaume pour 1911, 1912 et le 1er semestre 1913. 33 pp., 8vo. Kristiania, 1915. Price kr. 0.50.

——— Revenus, fortunes et répartition de l'impôt communal d'après les rôles de 1913-14. 264 pp., 8vo. Kristiania, 1915. Price kr. 1.00.

[In Norwegian, with translations of the headings to the Tables in French.]

Sweden. Bostadskommissionens Utredningar, vii. Bostadsfrågan i Utlandet. Vol. 1. Tyskland. Vol. 2. Belgien, Danmark, England, Finland, Frankrike, Forenta Staterna, Holland, Norge, Schweiz och Österrike, redogörelse utarbetad pa Kommissionens uppdrag och under dess inseende av *Erik Sjöstrand*. 2 vols., 8vo. Stockholm: P. A. Norstedt and Söner, 1916.

[An inquiry into the conditions of housing of the working classes in Germany and various other countries.]

The Athenæum Subject Index to Periodicals, 1915. Issued at the request of the Council of the Library Association. Economic and Political Sciences. Law. 28 pp., 4to. London: The Athenæum, 1916. Price 1*s*. net.

CURRENT NOTES.

The trade returns continue to show a growth in the value of imports, but a feature of the recent returns is the recovery in exports. Doubtless the higher level of prices is responsible for a part of the growth in the figures. The decreasing excess of imports over exports is, however, an encouraging feature. Our tables in the last issue of the JOURNAL showed that in the twelve months ending March last the excess of imports over exports of merchandise was over 360 millions sterling, and showed a growth of over 122 millions over the corresponding period a year earlier. The tables given below show, for the twelve months ending May, an excess of imports amounting to 357 millions, and a growth, compared with a year earlier, of less than 78 millions. An expanding excess of imports has yielded to a contracting excess, even though the contraction be slow.

The shipping figures show, as compared with those given in the last issue of the JOURNAL, a continued decrease in the tonnage using our ports for mercantile purposes, but the comparison with a year ago is now more favourable than that shown in the March JOURNAL.

The values of the principal classes of merchandise imported and exported in the twelve months ending May, 1916 and 1915, respectively, were as follows :—

	Twelve months ending May, 1916.	Twelve months ending May, 1915.	Increase (+) or decrease (−).
Imports, value c.i.f.—	£'000.	£'000.	£'000.
I. Food, drink and tobacco	401,625,	334,287,	+ 67,338,
II. Raw materials and articles mainly unmanufactured	289,538,	248,212,	+ 41,326,
III. Articles wholly or mainly manufactured...........................	193,843,	146,974,	+ 46,869,
IV. Miscellaneous and unclassified (including parcel post)....	3,228,	2,497,	+ 731,
Total merchandise....................	888,234,	731,970,	+ 156,264,
Imports of bullion and specie	23,258,	52,048,	− 28,790,

	Twelve months ending May, 1916.	Twelve months ending May, 1915.	Increase (+) or decrease (–).
Exports of produce and manufactures of the United Kingdom, value f.o.b.—	£'000.	£'000.	£'000.
I. Food, drink and tobacco	26,983,	25,222,	+ 1,761,
II. Raw materials and articles mainly unmanufactured	56,372,	48,789,	+ 7,583,
III. Articles wholly or mainly manufactured	328,176,	282,597,	+ 45,579,
IV. Miscellaneous and unclassified (including parcel post)	17,260,	8,918,	+ 8,342,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	21,386,	20,818,	+ 568,
II. Raw materials and articles mainly unmanufactured	56,377,	45,219,	+ 11,158,
III. Articles wholly or mainly manufactured	24,246,	20,811,	+ 3,435,
IV. Miscellaneous and unclassified	81,	76,	+ 5,
Total, British, foreign and colonial	530,881,	452,450	+ 78,431,
Exports of bullion and specie	60,471,	22,856,	+ 37,615,
Shipping—	Tons net. '000.	Tons net. '000.	Tons net. '000.
Total, British and foreign, *entered* with cargoes	32,227,	37,750,	– 5,523,
Total, British and foreign, *cleared* with cargoes	37,439,	45,227,	– 7,788,

The Board of Trade returns respecting retail food prices in the United Kingdom, which gave an increase of 48 per cent. from July, 1914, to the beginning of March last, show a further increase during the two following months. Up to April 1 the total increase was 49 per cent., up to May 1 55 per cent. The rise during April was mainly due to advances of about 6 per cent. in beef and mutton, 10 per cent. in sugar, and as much as 42 per cent. in the price of potatoes.

Tables in the *Labour Gazette*, based on returns in the *Statistische Korrespondenz*, which showed an increase in food prices in Berlin of 88·5 per cent. from July, 1914, to January, 1916, give an average increase of 85·6 per cent. up to February and 100·5 per cent. up to March. The principal increases between February and March were shown by meat (beef 29 per cent., mutton 26 per cent., veal 15 per cent., pork 16 per cent.), coffee (29 per cent.), and potatoes (37 per cent.).

For Vienna the average increase as compared with July, 1914, is 110·4 per cent. in March as against 112·9 per cent. in December.

As previously stated neither the figures for Berlin nor those for Vienna can now be held fairly to represent the situation as there is no longer a free market in many articles and several are practically unprocurable.

The movement of wholesale prices as shown by the *Statist* and *Economist* index-numbers is as follows:—

	Statist index-number.	*Economist* index-number.
July, 1914	82·4	116·6
February, 1916	127·0*	182·2
March, 1916	130·4	182·4
April, 1916	134·2	190·5

* Revised figure.

Both index-numbers make the rise in prices since the beginning of the war practically 63 per cent. As regards the several groups of commodities for which separate averages are given in the *Statist*, *vegetable foods* fell by 3·7 per cent. in March, to rise again by 8·7 per cent. in April, mainly owing to the great increase in the price of potatoes to which reference has already been made; the *sugar, coffee and tea* group rose by 7 per cent. in March and 2·7 per cent. in April; *minerals* rose by 6 per cent. in March and 1 per cent. in April. The *textile* group and the group of *sundries* only showed a relatively small rise in each month.

The *Gazette* price of British wheat, which was 57*s.* 9*d.* in February, remained at the same level in March and fell to 54*s.* in April.

The percentage of trade union members unemployed at the end of March and at the end of April remained at the same low level as at the end of February, viz., 0·5 per cent. In the insured trades the figure fell slightly from 0·8 per cent. at the end of February to 0·7 per cent. at the end of March and the end of April. All the principal industries were well employed and some working at great pressure. The increasing number of enlistments emphasises the need for more women and girls, and the substitution of these for men must be carried much further than hitherto if the requirements of industry are to be met.

The employers' returns for the textile and other industries both show a slight fall in the numbers employed as between the end of February and the middle of April, but a small increase in the wages paid. For the three principal textile trades the figures as regards wages are as follows:—

Percentage changes in wages paid in the weeks ending March 25 and April 15 as compared with the corresponding weeks a month earlier.

Week ending	Cotton.	Woollen.	Worsted.
March 25	+0·1	+0·1	+2·4
April 15	−0·0	+0·6	−0·1

Comparing the week ending April 15, 1916, with the corresponding week last year, the numbers employed in the textile trades have fallen by 2·4 per cent., in the other trades covered by these returns by 3·1 per cent.

In Germany the trade union returns showed 2·2 per cent. unemployed at the end of March, as against 2·8 per cent. at the end of February and 2·6 per cent. at the end of January. Unemployment is highest for the small union of hat makers (22·6 per cent.), but next highest for the textile workers (10·3 per cent.): this last figure shows, however, some improvement as compared with February, when the textile workers returned 12·1 per cent. as unemployed.

We noticed in the last number of the JOURNAL (pp. 241, 242) the fourth of a series of quarterly inquiries by the French Ministry of Labour into the effects of the war upon the industry and commerce of France. The fifth of these inquiries, which deals with the state of affairs in January last, is summarised in the *Labour Gazette* for May. The aggregate number of persons employed at the establishments covered by the inquiry represented 77 per cent. of the number normally employed in August, 1914, just before the war. But 24 per cent. of this normal number, it is estimated, had been mobilised, so that, allowance being made for these, the aggregate total of persons employed in January, 1916, exceeded by 1 per cent. the aggregate for August, 1914. In October the estimate gave an aggregate of 2 per cent. less than the pre-war total, so that the improvement noted in the last report has been continued. In January the greatest deficiency was noted in the case of the precious metal trades which (allowance being made for those mobilised) showed numbers employed 38 per cent. less than the normal, the building trades coming next with a deficiency of 30 per cent., and the printing trades and glass and pottery manufacture each with a deficiency of 29 per cent. On the other hand the chemical trades show an excess above normal of 14 per cent., and the metal and engineering trades an excess of 36 per cent.

The returns have disclosed a very large increase in the employment of women, but precise figures cannot be given. A table, dated January 1, 1916, compiled in the War Office, shows that the number of women employed in public and private establishments controlled by the Under Secretary of State has reached 109,300.

The Departmental Committee appointed by the Treasury on January 27, 1916, to consider and report upon any amendments in the financial scheme of the National Insurance Act which experience may suggest, and to advise how far the work of approved societies could be simplified and its cost reduced has presented an interim Report. [Cd–8251.] The financial problem which was submitted to them involved, in the first place, a consideration of the effect of the flat rate of premium. It is perhaps somewhat unexpected to find this method referred to with approval as securing a position of financial equilibrium, and the departure from its normal working which Parliament contemplated deprecated. The financial basis of the Act is stated to be derived from the experience of the Manchester Unity of Oddfellows, with a loading which is estimated at 24 per cent. Upon this formula the provision made is compared with the average expenditure for 1913 to 1915, excluding the disablement benefit. With regard to men, a favourable experience is deduced for 1913 and 1915, as against a slightly unfavourable one in 1914. With regard to women, the experience is throughout unfavourable. The Committee propose to meet this by an addition to the income available for current benefits. They consider that the claims are specially excessive in the case of married women. Even for men the position is unsatisfactory in societies which consist of persons exposed to more than the average risk provided for by the flat rate. For women, especially married women, separate provision is necessary. Serious deficiencies will probably appear on valuation which even good administration cannot avert. The Committee rightly recommend the repeal of the provisions of the Act which require a surrender of surplus and the reconsideration of those relating to pooling. They are equally right in regarding the remedy of merely making enquiry into the causes of excessive sickness as inadequate. To impose the penalty of reduction of benefits or imposition of levies in all cases would be inequitable. They were precluded by the terms of the reference to them from suggesting grants from the Exchequer, or increases in the rates of contribution for benefit. They also dismiss as inequitable a proposal to apply the surpluses in some societies towards the deficiencies in others. They recommend a revision of the provisions of the Act relating to a sinking fund, diverting 1,800,000*l.* a year from the 4,500,000*l.* a year which is the present nominal income of that fund, and they suggest a scheme for the application of the sum so diverted. In the case of women, they recommend that 280,000*l.* should be applied to increase the current income of the benefit funds, of which 135,000*l.* should be carried to a Women's Equalisation Fund, which would be supplemented by a grant from the Exchequer. This is to be a common fund for the whole of the United Kingdom. In the distribution of this fund they depart from the method of the flat rate, and they think their proposals would suffice to provide the sick and maternity benefits promised to women. For men, a special reserve fund is to be provided. There are also to be contingencies funds and special risks funds applicable to both sexes. The contingencies fund is to be about 710,000*l.* a year in respect of men and about 280,000*l.* in respect of women, or roughly 1,000,000*l.* in all.

The economic changes in the relation of the sexes caused by the war, and the incalculable further changes that will ensue when it is over, will probably affect the inferences drawn by the Committee. There is an indication of this in the fact that the actual cost of women's sick and maternity benefits was in 1915 only $2\frac{1}{25}$ of a penny per week per head, while in 1914 it was $2\frac{3}{5}$*d.* The Committee proceed to discuss the application of their proposals to societies of different types in detail too ample to be followed in this brief note. They then examine the case of those societies without branches which are at present subject to pooling provisions. They say, with truth, that the probable effect of these provisions in practice is very uncertain. They recommend, accordingly, that all societies with between 1,000 and 5,000 members should be exempted from pooling, and they think that this suggestion would remedy an element of unfairness in the existing Act.

The Committee, again rightly, recommend that the quinquennial valuation prescribed by the Friendly Societies Act should be restored, in place of the triennial valuation required by the Insurance Act. They urge the necessity of an actuarial investigation and tabulation of the experience of societies, though the perturbations caused by the war must affect the value of such an enquiry.

The Report is signed by all the members but one, Mr. Rockliff, a leading representative of the dividing class of societies, who would also have signed it if a memorandum he had prepared could have been attached.

Disablement benefit has not been dealt with in the present Report.

In December, 1913, a Board of Inquiry was appointed to make an investigation into the increase in the cost of living in Canada, and the causes which have occasioned or contributed to such result. The Report of the Board has now been issued, in two volumes of some thousand pages each, of which the report proper occupies only some 80 pages in vol. I. The remainder of the volumes is occupied by a number of articles on special subjects and industries, of which the most important is an "exhibit" of the Statistical Branch of the Department of Labour prepared by Mr. R. H. Coats. This appears in what was apparently a preliminary form in vol. I., and in its revised form occupies the whole of vol. II., a synopsis being also given in separate form. The "exhibit" deals in the widest possible way with the rise in prices in Canada and other countries, and it may be of interest to give some extracts from the data and conclusions.

The Department of Labour issued in 1909 a special report on wholesale prices since 1890, and annual reports since that date, the index-numbers given covering 272 items. From 1890 to 1897 prices fell considerably, but after that year a violent reaction set in, and between 1897 and 1913 prices rose by more than 50 per cent., with only one marked break after the crest of 1907. The table below shows the weighted and unweighted averages :—

Index-numbers of wholesale prices. (*Base period* 1890-99.)

Year.	Weighted.	Unweighted.	Year.	Weighted.	Unweighted.
1890	112 ·0	110·3	1902	109 ·6	109 ·0
1891	111·3	108 ·5	1903	109 ·7	110 ·5
1892	104 ·9	102 ·8	1904	110 ·6	111 ·4
1893	103 ·9	102 ·5	1905	113 ·8	113 ·8
1894	97 ·2	97 ·2	1906	120 ·1	120 ·0
1895	95 ·6	95 ·6	1907	129 ·2	126 ·2
1896	90 ·6	92 ·5	1908	125 ·1	120 ·8
1897	89 ·9	92 ·2	1909	126 ·3	121 ·2
1898	95 ·5	96 ·1	1910	128 ·0	124 ·2
1899	99 ·0	100 ·1	1911	131 ·1	127 ·4
1900	105 ·8	108 ·2	1912 ...	143 ·9	134 ·4
1901	106 ·0	107 ·0	1913	139 ·6	135 ·5

Retail prices for food and fuel since 1909 are also covered by data published in the Canadian *Labour Gazette*, and for the purpose of this enquiry comparative data have been obtained for 1900 and 1905. The average based on a weekly family budget is as follows :—

Index-numbers for retail prices of food and fuel.

1900	100·0	1911	131·5
1905	108·7	1912	137·8
1909	122·4	1913	138·2
1910	127·3		

Retail prices for food and fuel rose, therefore, by 38 per cent. from the beginning of the century, up to 1913, while wholesale prices in general rose by some 32 per cent. The principal index-numbers for other countries of the world are given, and the price changes compared with those for Canada. But these we must pass over.

In the same period cost of services by no means followed in all cases the course of commodity prices. The price of water-service fell by some 4 per cent.; the price of electric light by nearly 30 per cent.; of illuminating gas by 23 per cent., and of fuel gas by some 18 per cent., while railway freight charges also fell by some 5 or 6 per cent. Hospital tariffs, on the other hand, followed the course of prices and rose by some 50 or 60 per cent., practically following the average cost per patient. Rents rose enormously. The rents of offices and stores doubled and trebled, and of working men's dwellings rose by some 60 to 70 per cent. The following are the index-numbers based on statistics furnished by correspondents of the *Labour Gazette* for typical six-roomed dwellings with sanitary conveniences in working men's quarters:—

Index-numbers for rents of workmen's dwellings.

1900	100·0	1911	143·2
1905	119·0	1912	153·7
1909	135·4	1913	162·0
1910	140·7		

The figures are supported by data specially obtained from real estate agents for the present investigation; these give an index-number of 121·0 for 1905 and 170·4 for 1913. The figures stated are unweighted averages, but averages weighted by population do not differ substantially.

As against these increases in the cost of house-room, food and fuel, the following is the course of wages as given by a special investigation into the rates of wages in leading industries commenced by the Department in 1912:—

Index-numbers for wages.

1900	100·0	1907	119·2
1901	102·0	1908	121·1
1902	104·3	1909	125·4
1903	106·1	1910	129·7
1904	108·8	1911	133·1
1905	111·6	1912	139·3
1906	114·5	1913	142·9

The rise is rather more than that of food and fuel prices, considerably less than of rents. Inquiry was also made into the salaries of the clergy and of school-teachers. The salaries of the former rose by some 30 per cent. during the period, of the latter by some 47 per cent. The high rates of increase in the West in these cases, it is pointed out, reflect general development as well as cost of living conditions.

Turning from these data to the statistics of finance, we extract the following index-numbers for the prices of stocks and bonds :—

Year.	Index-number for prices of common stocks.		Index-number for prices of bonds.	
	Unweighted.	Weighted by sales.	Unweighted : actual prices.	Unweighted : prices based on net earnings.
1900	100·0	100·0	100·0	100·0
1901	105·7	107·8	99·2	99·8
1902	111·8	121·5	101·1	100·7
1903	104·9	112·7	95·8	96·5
1904	99·7	100·5	84·1	94·5
1905	108·6	115·1	97·9	98·9
1906	113·9	—	100·2	99·6
1907	105·2	103·9	88·4	95·6
1908	103·0	108·9	94·9	94·1
1909	115·6	107·4	99·4	98·4
1910	120·4	123·5	100·0	98·5
1911	127·2	139·2	100·2	98·3
1912	133·8	146·7	100·5	97·6
1913	128·9	143·2	97·5	95·5

The prices of common stocks, it will be seen, have increased remarkably, and when the index-number for each group of stocks (banks, industrials, &c.) is weighted by the volume of annual sales in that group the increase is accentuated. The greatest increases have occurred in the groups of land, loan and mortgage companies, light and power companies, the C.P.R., electric railways, and trust companies. The group of industrial bonds for which continuous prices were available is only a small one, but prices show, on the contrary, a slight fall.

The rate of interest on city mortgages during the period rose by some 20 per cent., on farm mortgages by some 12 per cent., while the yield of Canadian 3 per cent. rose from 2·97 per cent. to 3·56 per cent. The average rate at which loans were made or paper discounted by Canadian banks rose by 9 or 10 per cent.

A discussion of the trade-balance during 1900–14, with the necessary additions and deductions, leads to the conclusion (p. 906) that the balance representing borrowing amounts to some $2,713,300,000. Data are not available for estimating the distribution of the new capitalization over the whole period, but over 1900–1910 it is estimated as follows (p. 934) in millions of dollars:—

(1) *Industries of primary production.*

Agriculture—	
Farm buildings	150
Implements	125
Live stock	150
Fishing	10
Mining	30
Total	465

(2) *Other undertakings.*

Railways	700
Electric railways	50
Manufacturing (working capital)	355
Canals and public works	100
Municipal growth	600
Total	1,805

The increase in the second group is practically four times that in the first. During the decade 1901–11 Canadian agricultural production, as measured by the value of products after correcting for the rise of prices, increased by 37 per cent.; the actual value of products increased by 82 per cent. The value of manufactured products increased by 142 per cent. Transportation increased enormously; train mileage from 55 millions in 1900 to 113 millions in 1913: tons of freight from 36 millions to 107 millions: gross earnings from 71 million dollars to 257.

The standard of living also rose during the period. Not only did the consumption of wheat and meat increase, but there was a more marked rise in the consumption and importation of luxuries. The *per capita* consumption of beer, wine and spirits increased by 55 to 60 per cent., and tobacco by 66 per cent. At the same time the expenditure on education and the contributions to the churches rose considerably, and the *per capita* payments for life insurance rose from 2·81 dollars in 1900 to 4·97 in 1913.

The period as a whole was thus one of great prosperity and of industrial more than of agricultural expansion. In Canada, as in the other countries in which prices rose most rapidly, food prices rose more than those of materials. Canada has been going further afield for her supplies, more especially for her food supplies. Imports of agricultural and animal products from the United Kingdom and the United States increased by 103 per cent., from other countries 283 per cent. "The appearance of New Zealand "butter, Chinese eggs and Irish potatoes on Ontario markets "indicate a revolution in the methods by which Canadian house-"holds are supplied" (p. 1060). "The great rise in prices that has "taken place in Canada is accordingly found to centre largely in "the new distribution problem which has been created by the "lessening of local food supply during an era of heavy expenditures "on capital account" (p. 1069). The lines of remedy suggested are the encouragement of food production and the removal of every possible economic weight in the distribution process.

The U.S. Bureau of Labour Statistics has issued a Report on the regularity of employment in the women's ready-to-wear garment industries (Bulletin 183). The group of industries in question is one which has grown with great rapidity during the last 30 years. In 1889 the "value of products" was estimated at 68 million dollars; in 1899 at 159 million dollars; in 1909 at 385 million dollars. The great majority of the workers are foreign born, and an exceedingly small proportion have had any training or experience while abroad for the occupations in which they have found employment. The report gives a mass of information, freely illustrated by charts, as to the seasonal fluctuations in these industries, as shown by weekly pay-rolls, in New York City, Chicago, Cleveland and Boston.

In the case of New York City the women's custom-tailoring industry has been included for the sake of comparison, and shows the most remarkable fluctuation of the whole group. Calling the average weekly pay-roll for the year 100, the magnitude of the fluctuation in the several trades is roughly illustrated by the following figures extracted from Table I of the Report:—

	Percentage of average weekly pay-roll.		
	Lowest.	Highest.	Range.
Custom tailoring	12·3	195·5	183·2
Cloaks, suits and skirts	43·2	164·4	121·2
House dresses and kimonos	45·3	139·9	94·6
Dresses and waists	52·6	137·2	84·6
Children's and misses' dresses	53·7	127·3	73·6
Women's muslin underwear	70·9	119·8	48·9

The range is obviously a rough measure of fluctuation, but the results are supported by other measures, *e.g.*, the number of weeks in which the pay-roll varied by at least 20 points from the average. Custom tailoring is by far the most seasonal trade; the (ready-to-wear) cloak, suit and skirt industry comes next, whilst the underwear industry is by far the most stable. The percentage on the average pay-roll is given for each week of the year (August, 1912, to July, 1913), and the seasonal fluctuations shown by a chart. Custom tailoring shows two very sharp maxima, in October (pay-roll nearly double the average) and April (pay-roll 84 per cent. above average), and minima at the beginning of August (pay-roll an eighth of average) and in January–February (pay-roll some 60 per cent. of average). In the cloak, suit and skirt industry the general course is similar, but the maxima and minima occur earlier. At the end of the report the factors which influence regularity of employment are discussed and the possible methods of remedy. The primary cause of seasonal changes in employment is the seasonal change in the weather. But seasonal changes in weather need not inevitably produce seasonal changes in employment provided the work could be produced evenly throughout the year in advance of sales. The cases studied show that the more a manufacture is specialised the greater is the fluctuation, and the higher the quality the greater the fluctuation. Fundamentally, the difficulty is "the "fickleness of fashion and the unsaleability of a garment that is "out of style." The writers suggest (p. 93) that if all the manufacturers devoted the same effort to pushing standard lines that they do to introducing novelties the situation would be materially changed for the better. Improvement would also be effected by the elimination of the smaller houses, and by the reduction of specialisation, manufacturers undertaking more than one line of goods so that the busy season of one might cover the dull season of others.

The New York State Labour Law provides that no child between the ages of 14 and 16 shall be employed in a factory or in a mercantile or other specified establishment unless he or she is in possession of an employment certificate. As a condition of granting this certificate the law requires that the child shall have completed the work prescribed for the first six years of the elementary schools, and that in the opinion of the issuing officer the child shall have reached the normal development for his age. With a view to determining certain forms of physical development which might serve as a guide to those upon whom devolves the duty of issuing employment certificates, Dr. Lee K. Frankel and Dr. Louis I. Dublin, of the Metropolitan Life Insurance Co. of New York, have carried out an investigation into the height and weight statistics for 10,043 children (5,393 boys and 4,650 girls) who received certificates during the nine months ending April 12, 1915. The frequency distributions are given and correlation tables between height and weight. The correlations are as follows:—

Age.	Boys.	Girls.
14—15....	·776 ± ·0046	·499 ± ·0095
15—16.... ...	·759 ± ·0064	·439 ± ·0128

(Height was measured in shoes and weight in clothes.) The averages at each age are also discussed in relation to nationality. As regards standards of development, the authors first suggest the rejection of all who deviate from the average weight for a given height by more than the standard deviation, but find this too severe a test. It would mean allowing a deviation of 10 per cent. from the average weight for boys and·12 per cent. for girls. They therefore suggest increasing this allowance to 15 per cent. of the average for both sexes, which would mean rejecting some 3·5 per cent. of the boys and 9·4 per cent. of the girls. The adoption of a limit which works more stringently for the girls seems to them desirable.

The Medical Research Committee have issued the first Report of the Special Investigation Committee upon the incidence of phthisis in relation to occupations, the report referring to the boot and shoe industry. The returns of the Registrar-General show that phthisis is especially prevalent in this industry, though the general mortality is practically average and the mortality from alcoholism and from liver disease is low. The conclusion is supported, in the report of the Committee, by a comparison of the proportion of phthisis deaths to deaths from all causes, at age-groups, in the National Union of Boot and Shoe Operatives and amongst Leicester and Northampton operatives as against the Amalgamated Society of Engineers and the general population of the two towns named, and of England and Wales. The clicking, lasting and making-up, and finishing departments show a relatively higher incidence of the disease than the group of "all other departments and not defined," judging by the deficiency of actual as compared with calculated deaths in the last-named class on the assumption that the proportion of phthisis-deaths to all deaths is at each age-group the same for each department. The Committee conclude that hereditary predisposition cannot be of importance, as a high relative mortality from phthisis is shown by boot and shoe operatives in every town in which the industry is carried on. Poverty and consequent malnutrition cannot be assumed as an important cause seeing that earnings are not less than those of other indoor trades in which a lower phthisis mortality is found, and no signs of malnutrition were observed in an examination of nearly 700 operatives. The mortality from alcoholism, as already mentioned, is low. The housing of the operatives at Leicester and Northampton compares favourably with that of other industrial towns. There is little risk of infection from the materials used, and there is no evidence of overcrowding beyond the legal minimum of space per operative in the factories. The Committee can only conclude that the individual worker is predisposed to infection by the sedentary nature of his occupation and possibly by the attitude adopted at work, and that the infection is probably increased by the number of infective workers and favoured by want of light, the presence of infected dust and inadequate ventilation in the workrooms. The Committee make recommendations as to periods for rest and exercise and as to the provision of artificial ventilation, and suggest a scheme for establishing in conjunction with a sanatorium a workplace for the manufacture of boots and shoes.

The Final Report of the Royal Commission on Venereal Diseases [Cd–8189] provides copious statistical data for the discussion of many important problems. Two questions of interest are:—(1) What is the actual prevalence of venereal diseases in this country? (2) Are these diseases becoming less widespread? The Commission point out that it is impossible to give a full answer to either question, because the national statistics are incomplete, partly owing to difficulties of diagnosis, but still more on account of reluctance to certify syphilis as a direct or contributory cause of death. Several attempts were made to throw light upon the question of prevalence by means of special inquiries. Dr. Fildes submitted the results of 1,002 serum tests made upon patients, or friends of patients, attending the London Hospital for causes unconnected with syphilis between May 11 and July 2, 1914. Positive reactions were obtained in the case of 10·3 per cent. of 616 males and 5·1 per cent. of 389 females. Sir John Collie applied the same test to 500 apparently healthy working-class people over the age of 21 (all males) who came under observation because they were required to pass a medical examination before entering into their employment. Forty-six of these, or 9·2 per cent., gave a positive reaction.

In the case of 545 samples from patients in 14 asylums, 15·4 per cent. undoubtedly positive results were recorded.

The following are the results of a series of investigations carried out under the supervision of Dr. Mott. Of 418 adult cases of epilepsy, 7·4 per cent. gave positive reactions; of 1,483 patients admitted to three poor-law infirmaries, 19·9 per cent. reacted positively; of 257 children in a national institution for those requiring care and control, 8·1 per cent. reacted positively. With reference to Dr. Fildes' investigation the Commissioners observe:—
"If these patients can be regarded as a fair sample of such a "population (*i.e.*, that of the East of London), it follows that in a "typical working-class population of London at least 8 to 12 per "cent. of the adult males and at least 3 to 7 per cent. of the adult "females have acquired syphilis."

It is, of course, necessary to bear in mind the limitation stated, which might have been emphasised with advantage. What we really desire to know is the proportion of persons who at some time in their lives acquire syphilis, and this is not the same thing as the proportion found to be suffering from the disease or its effects at a given instant. It will be remembered that an attempt was made by Lenz (*Archiv. f. Rassen. u. Gesell. Biologie*, 1910, vii, 306) to solve this rather complex actuarial problem, but, as pointed out by Elderton (*Biometrika*, 1911-12, viii, 437), Lenz's method, although correct in principle, was faulty in application. Owing to the absence of such data as, for instance, the expectation of life at various ages of persons suffering from syphilis, it is hardly possible to go beyond the suggestion that considerably more than 10 per cent. of the male population may suffer at some time during their lives, although we trust that in this country the proportion falls short of the enormous figure assigned by Lenz to the inhabitants of Berlin. It may be remarked that the evidence of Professor Blaschko of Berlin is to the effect that venereal diseases are more prevalent in Germany than in England. He quotes statistics suggesting that not less than 20 per cent. of the boys in the highest gymnasium classes indulge in sexual intercourse, and states that Viennese statistics relating to 10,057 cases of venereal disease comprise more than

50 per cent. of minors. With the general aspects of the report we are not here concerned, but we may note that the Commission endorses the proposal that a system of confidential certification of causes of death should be adopted. They are "deeply impressed "by the facts that accurate knowledge of the prevalence of diseases "is essential in the national interests, and that such knowledge, in "the cases of venereal diseases especially, is most defective."

This is a subject which has frequently engaged the attention of the Royal Statistical Society.

In the Review of Mr. Hepburn's History of Currency in our last number there appears (on page 211) the sentence—"We may "leave these definitions as a matter between Mr. Conant and Professor "Irving Fisher." This should read—"We may leave these definitions "to Mr. Conant and Professor Irving Fisher." An editorial alteration in the reviewer's copy, made owing to the death of Mr. Conant, unfortunately suggested a difference of opinion between the two writers named.

With reference to the allusion made in the course of the discussion on Major Leonard Darwin's Paper to the practice of polygamy in certain parts of Germany after the Thirty Years' War (see page 186, Vol. lxxix, Part 2, 1916), the attention of the President has been called to the absence of authority for the statement that this practice was allowed by a papal Bull.

Lord George Hamilton desires, therefore, to correct this statement that the practice, which undoubtedly prevailed, had received papal sanction.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

Accountants' Magazine—

April, 1916—Notes on ascertainment of Share of Profits of Controlled Establishments payable to Exchequer under Munitions of War Act, 1915. Social Legislation of Queen Elizabeth.

May, 1916—Mineral Values for Casualties. The Share Transfer Audit.

Bankers' Magazine—

April, 1916—The Great Crisis. xxi. Progress of Banking in Great Britain and Ireland during 1915. The Function of Gold in International Finance. Canadian Banking in 1915. John Law of Lauriston. The lighter side of Finance.

May, 1916—The Great Crisis. xxii. The Budget. Does London's claim to being the International Money Market of the World still hold good? Progress of Banking in Great Britain and Ireland during 1915.

Eugenics Review. April, 1916—The Study of Heredity: *MacBride* (*Prof.*). Eugenic Problems after the War: *Poulton* (*Prof.*). The Biological Theory of Nurture: *Thomson* (*J. Arthur*).

Journal of the Institute of Bankers—

April, 1916—How the Passbook has been superseded in the case of large Accounts: *Merry* (*J. Tate*). Bank Clerks and "Benefit of Clergy": *Phillips* (*Maberly*).

May, 1916—The Association of Chambers of Commerce on Banking Methods.

Quarterly Journal of the Royal Meteorological Society. April, 1916—The Winter Climate of the Eastern Mediterranean: *Lyons* (*Major H. G.*). The Rainfall of Nigeria and the Gold Coast: *Brooks* (*C. E. P.*). South African Coast Temperatures: *Sutton* (*Dr. J. R.*).

Journal of the Board of Agriculture—

April, 1916—The French Agricultural Labour Problem. Economy in Food: *Wood* (*Prof. T. B.*). Fish Meal as Food for Pigs: *Crowther* (*Charles*). Public Elementary Schools and Food Supply in War time. The Sale of Home Grown Wool: *Grist* (*Digby B.*). Mangolds or Swede Turnips for Dairy Cows: *Dunne* (*John J.*).

May, 1916—Identification of the Country of Origin of Commercial Oats: *Stapledon* (*R. G.*). Proceedings in 1915 under the Tithe, Copyhold, Commons and other Acts. The Employment of Women on the Land.

United Kingdom—*Contd.*

Journal of the Royal Agricultural Society. Vol. 76, 1915—Physiology and Bacon-Curing: *Mackenzie* (*K. J. J.*) and *Marshall* (*F. H. A.*). The Corn Trade during the War: *Kains-Jackson* (*C.*). Farmers and their Income Tax Assessments: *Orwin* (*C. S.*). Dairy Husbandry in Lancashire and Cheshire: *Young* (*T. J.*). Agricultural Statistics: *Stanley* (*Russell E.*).

Journal of Society of Comparative Legislation—

July, 1915—The Legal Position of the Declaration of London: *Roxburgh* (*Ronald F.*). The Relation of Adverse Possession to Registration of Title: *Hogg* (*James Edward*). An Imperial Legislative Reference Bureau: *Bedwell* (*C. E. A.*). Common Law Naturalisation and Expatriation: *Edwards* (*F. B.*). The Organisation of the Bar in the British Empire: *Knight* (*Holford*). Divorce in Japan: *Becker* (*L. E. De*). Women's Work in the Courts in the United States: *Musgrave* (*Mrs. Herbert*).

January, 1916—The International Joint Commission: *Burpee* (*J.*). Labour Legislation in the United States: *Rosenbaum* (*Samuel*). Some Notes on the Constitution and Legislation of the Federated Malay States: *Innes* (*J. R.*). The Income Tax of the Self-Governing Dominions: *Minnies* (*S. E.*).

Public Health—

April, 1916—The Report of the Royal Commission on Venereal Diseases. Municipalities and Venereal Disease: *Porter* (*Charles*). The County Administration of Derbyshire: *Barwise* (*Sidney*). The Care and Control of the Tuberculous Patient: *Thomson* (*H. Hyslop*).

May, 1916—Typhus in the Wittenberg Camp. A Discussion on Maternity and Child Welfare: *Renney* (*H.*). Tuberculosis and Cotton operatives: *Middleton Hewat* (*A.*). Cerebro-Spinal Fever: An Analysis of the St. Pancras Cases in the Epidemic of 1915: *Higgins* (*T. Shadick*).

Surveyors' Institution. Transactions—

Part vii. *April*, 1916—The principles and position of Town planning: *Daridge* (*W. R.*).

Part viii. *May*, 1916—Scheme for the Development of Agricultural Land: *Keen* (*Frank Noel*).

United States—

American Economic Review. March, 1916—The Comparative Yield of Trade and Public Service Investment: *Sterrett* (*J. E.*). The Standard of Living—Up or Down? *Fairchild* (*Henry Pratt*). The Tariff and the Ultimate Consumer: *Wooster* (*Harvey A.*). The Farmer's Income: *Goldenweiser* (*E. A.*). The Influence of Speculative Marketing upon Prices: *Usher* (*Abbott Payson*). Russian Land Reform: *Ely* (*Richard T.*). Depreciation Reserves as Affected by Property Growth: *Nash* (*L. R.*).

UNITED STATES—*Contd.*

American Economic Review—Contd.

Supplement to. March, 1916—The Apportionment of Representatives; Annual Address of the President: *Willcox* (*Walter F.*). Probable Changes in the Foreign Trade of the United States Resulting from the European War: *Johnson* (*Emery R.*). Budget Making and the Increased Cost of Government: *Cleveland* (*Frederick A.*). The Economic Costs of War: The Theoretical Side: *Clark* (*John Bates*). The Statistical Side: *Rossiter* (*William S.*). Economic Theorizing and Scientific Progress: *Hollander* (*Jacob H.*). The Rôle of Money in Economic Theory: *Mitchell* (*Wesley C.*). Price Maintenance: *Taussig* (*F. W.*). The Relation of Public Finance to Private Credit: *Straight* (*Willard*).

American Journal of Sociology. March, 1916—Psychic Causes of Rural Migration: *Groves* (*Ernest R.*). Aboriginal Maize Culture as a Typical Culture-Complex: *Wissler* (*Clark*). Creating Social Values in the Tropics: *Meyer* (*Ernest C.*). The Legal Status of Negro-White Amalgamation in the United States: *Jenks* (*Albert Ernest*).

Annals of American Academy of Political and Social Science. March, 1916—Contains a series of articles by different authors on Public Administration and Partisan Politics grouped under the following heads:—1. The Cost of Partisan Politics in the work of Government. 2. Movements to Free Public Administration from Partisan Politics. 3. Public Policies in a Responsible Government.

Bankers' Magazine (*New York*)—

March, 1916—Lending by the Billion: *Patterson* (*E. M.*). The Country Clearing House: *Wolfe* (*Howard O.*). Canadian Banking and Commerce: *Eckardt* (*H. M. P.*).

April, 1916—Loss of American Gold after the War: *Requard* (*Geo. G.*). The American Banker's Part in the Development of Our Foreign Trade: *Rovensky* (*John E.*).

May, 1916—An American Banking System. The Argentine Republic as a Field for American Capital and Enterprise: *Tornquist* (*C. A.*). London Acceptances and their Creators: *British Bank Official.*

Journal of Political Economy—

March, 1916—The Changing Basis of Economic Responsibility: *Clark* (*J. Maurice*). The Westinghouse Electric and Manufacturing Company. The General Electric Company and the Panic of 1907. I: *Carpenter* (*Niles*). The Settlement of Disputes under Agreements in the Anthracite Industry: *Sydenstricker* (*Edgar*). Agreements between American and European Molders' Unions: *Stockton* (*Frank T.*).

UNITED STATES—*Contd.*

Journal of Political Economy—Contd.

April, 1916—Fetters "Economic Principles": *Davenport* (*H. J.*). What is Agricultural Economics? *Nourse* (*E. G.*). The Westinghouse Electric and Manufacturing Company, the General Electric Company and the Panic of 1907. II: *Carpenter* (*Niles*).

Political Science Quarterly. March, 1916—The Problem of Unemployment To-day: *Leiserson* (*W. M.*). Single-Tax movement in Oregon: *Gilbert* (*James H.*). Land Tenure Reform and Democracy: *Putnam* (*George E.*). Pan-American Monetary Unity: *Kemmerer* (*E. W.*). The Presidential Primary of Oregon: *Barnett* (*James D.*). Woman's Suffrage in the City of Chicago: *Eckert* (*F. W.*). Common Sense in Foreign Policy: *Shepherd* (*W. R.*).

Quarterly Journal of Economics. May, 1916—Minimum Wages for Women: *Taussig* (*F. W.*). Economic Value and Moral Value: *Perry* (*Ralph Barton*). The Extent of Labour Organization in the United States in 1910: *Wolman* (*Leo*). Electrical Rates: The Load Factor and the Density Factor: *Watkins* (*G. P.*). Depreciation and Rate Control. A Further Discussion: *Bonbright* (*James C.*). Appendix: Statistics on Labour Organization.

Quarterly Publications of American Statistical Association. No. 113. *March*, 1916—The Nature and Significance of the Changes in the Birth and Death-rates in Recent Years: *Willcox* (*Walter F.*). Statistics of Imports and Exports: *Rutter* (*Frank R.*). The Mortality of our Public Men: *Fisher* (*Irving*). The Agricultural Element in the Population: *Merritt* (*Eugene*). The Mother and Infant Mortality: *Hibbs* (*Henry H.*). Measures of Relative Tax Burdens: *James* (*A. E.*). Statistics of the Food Supply in Germany: *Woodbury* (*Robert Morse*). Proceedings of the Seventy-seventh Annual Meeting of the American Statistical Association, Washington, D.C. December 28-30, 1915.

Transactions of the Actuarial Society of America. No. 54. *October*, 1915—Life Extension: *Craig* (*James M.*). Premium Loadings and Expense Limitations: *Rhodes* (*Edward E.*). Annuities with Participation Based upon Select and Ultimate McClintock Tables: *Fackler* (*David P.*). Requirements as to Health under Applications for Reinstatement of Policies. Mortality under Reinstated Policies: *Hunter* (*Arthur*). Military Service and its Bearing on the Policy Contract. The Recent European War Experience of the Mutual Life Insurance Company of New York: *Thompson* (*John S.*).

Yale Review. April, 1916—President Wilson's Administration: *Storey* (*Moorfield*). America's Obligation and Opportunity: *Adams* (*George B.*). The War and American Democracy: *Abbott* (*Wilbur C.*). The Campaign in Western Asia: *Dwight* (*H. G.*). With the British Medical Corps in France: *Cushing* (*Harvey*). The Federal Valuation of the Railroads: *Gaines* (*Morrell W.*). Letters from Russia during the Crimean War: *Gilman* (*Daniel C.*).

CUBA—

La Reforma Sociale—

February, 1916—El movimiento socialista en Italia: *Campanozzi* (*A.*). La Doctrina Monroe y el Congreso de Panama: *Lopez* (*Jacinto*). La enseñanza agrícola en sus distintos grados: *Comallonga* (*José*).

March, 1916—Revista de los Acontecimientos: *Lopez* (*Jacinto*). La Enseñanza Agricola en sus distintos grados: *Comallonga* (*Jose*). La actual situacion economica de Cuba: *Perez* (*Luis Marino*). La preponderancia maritima y la Guerra: *Darray* (*Henry D.*).

April, 1916—Alemania y los Estados Unidos: *Lopez* (*Jacinto*). Mexico y los Estados Unidos: *Lopez* (*Jacinto*). El poder Naval de los Estados Unidos: *Lopez* (*Jacinto*). Los Origenes de la Industria Azucarera en Cuba: *Wright* (*I. A.*). La Organizacion de los Partidos Politicos: *Ramos* (*J. Lopez*).

FRANCE—

Bulletin de la Statistique Générale de France. October, 1915—Enquête sur les prix de vente au détail des denrées dans les villes. Cours des viandes à Paris (gros et détail). Statistique du conseil des prises: *Wörms* (*René*). Agriculture. Les forêts de France 1908. Industrie. France: Statistique des métiers à tisser de la fabrique lyonnaise, 1914. Industrie. Danemark: Recensement des industries et métiers, 1914. Coût de la vie. Norvège: Budgets de familles d'employés. Suisse: Budgets de familles et dépenses d'alimentation.

Bulletin de Statistique et de Législation Comparée—

February, 1916—La production des vins et des cidres en 1915. Les opérations de la Banque de France en 1915. Les revenus de l'Etat.

March, 1916—Le commerce de la France avec les pays étrangers. Les revenus de l'État. Les finances de guerre de l'Angleterre.

Journal des Economistes—

March, 1916—Les Causes et les Conséquences de la guerre: *Guyot* (*Yves*). La Guerre et les Chemins de fer allemands: *Raffalovich* (*Arthur*). L'Application de l'Impôt sur le revenu. (Quelques difficultés): *Fredault* (*Felix*). La Question des effectifs allemands: *Gouvy* (*L.*). La Budget italien: *Pisani* (*Lorenzo*). La Circulation fiduciaire des Chambres de commerce: *Evesque* (*Maurice*). Revue de l'Académie des sciences morales et politiques: *Lefort* (*J.*). La Situation économique et financière du Japon: *Nouvion* (*Georges de*). Le Blocus des titres et des coupons: *A. R.* La Ligue du libre-échange en février 1916: *D. B.*

April, 1916—La Guerre et les Lois économiques: *Guyot* (*Yves*). Ce qu'était le domaine colonial allemand: *Bellet* (*Daniel*). La Réforme financière en Russie: *Lauwick* (*M.*). L'Exposé financier de M. Helfferich pour 1916-17: *Raffalovich* (*A.*).

FRANCE—*Contd.*

Journal des Economistes. April, 1916—*Contd.*

L'Impôt sur le revenu et la déclaration: *Gurault* (*Arthur*). La Marine marchande française à la fin de 1915: *Pawlowski* (*Auguste*). La Cour des comptes et les Chemins de fer de l'Etat: *Nouvion* (*Georges de*). L'Alimentation en viande de la France pendant la guerre: *Gouault* (*Emile*). Italie: La dette publique-Recensement et requisition des céréales-L'Importation de la houille.—Les Ports italiens et les Ports de l'Europe du Nord-Le Commerce italien: *Pisani* (*Lorenzo*). Espagne: L'Influence de la guerre sur le commerce extérieur espagnol.—La Législation douanière espagnole: *Meriel* (*P. de*). Amérique de Sud et Amérique centrale: *Bougeois* (*H.*). Jurisprudence financière et commerciale: *Tchernoff* (*I.*). La Ligue du libre-échange en mars 1916: *D. B.*

May, 1916—Les Lendemains de la paix. Le Commerce extérieur des Etats-Unis: *Guyot* (*Yves*). Devrions-nous capturer le commerce allemand? *Bell* (*Sir Hugh*). Les Chemins de fer allemands en Afrique: *A. R.* Économie réalisable: *Champon* (*C.*). Mouvement scientifique et industriel: *Bellet* (*Daniel*). Les Compagnies de chemins de fer en France en 1915: *Nouvion* (*Georges de*). Italie: Les Éléments de la richesse italienne: * * *. Espagne: La Banque d'Espagne en 1915: *Meriel* (*P. de*). Le Commerce brésilien (avec graphiques): *H. B.*

Journal de la Société de Statistique de Paris—

April, 1916—La prospérité économique de l'Allemagne; sa "place au soleil" et la guerre: *Cadoux* (*Gaston*). Variété: La production fruitière française et ses débouchés: *Dubern* (*B.*).

May, 1916—Chronique de démographie: *Huber* (*Michel*). La population et les lois électorales en France, de 1789 à nos jours (première et deuxème parties): *Meuriot* (*Paul*).

La Réforme Sociale—

January, 1916—La leçon maîtresse de la guerre: La loi du travail: *Maître* (*Jean*). Le Mouvement économique et social. Allemagne et Autriche-Hongrie: *Blondel* (*G.*).

February, 1916—Des titres au porteur perdus, volés ou détruits et des moyens d'en recouvrer la jouissance: *Génart* (*Ch.*). Le sort des orphelins de la guerre: *Berthelemy* (*H.*). Histoire d'un plan d'études: *Bioche* (*Ch.*). Le mouvement économique et social. Pays de langue anglaise: *Rotours* (*Baron J. Angot des*).

March, 1916—La rééducation des mutilés de la guerre: *Goetschy* (*Général*). Le mouvement économique et social. Italie et Espagne: *Lepelletier* (*F.*).

April, 1916—L'Anarchisme produit allemand: *Clement* (*Henry*). Les conséquences économiques de la guerre: La vie chère: *Falck* (*Etienne*). Une loi contre la famille: La légitimation des enfants adulterins: *Massabuau* (*J.*). La plus grande famille: *Larrieu* (*Pierre*). Le concours des grandes familles au front. Le mouvement économique et social. Allemagne et Autriche-Hongrie: *Blondel* (*Georges*).

FRANCE—*Contd.*

La Réforme Sociale—Contd.

May, 1916—Michelet et la guerre actuelle : *Fouques-Duparc* (*J.*). De quelques préjugés financiers : *Evesque* (*Maurice*). Comment l'Allemagne s'était au point de vue économique préparée à la guerre : *Blondel* (*Georges*). Le mouvement économique et social. Pays anglo-saxons : *Rotours* (*Baron J. Angot des*).

Revue d'Economie Politique. March–April, 1916—L'or et le change : *Gide* (*Charles*). Les Dardanelles et les céréales roumaines : *Bellet* (*Daniel*). La réalité et la personnalité dans l'impôt : *Achard* (*A.*). Les moyens de relever la natalité chez les peuples civilisés : *Simon* (*Paul*). Le régime des grains en Italie. La houille blanche dans la période 1908–1913. La houille blanche en Norvège.

Revue des Sciences Politiques. April, 1916—Indochine. Nos grandes colonies et la guerre : *Brenier* (*Henri*). Tunisie. Nos grandes colonies et la guerre : *Barbizet* (*Jean*). L'Amérique latine en 1915 : *Lorin* (*Henri*). Une poignée d'Allemands libéraux : *Wampach* (*G.*). Les opérations de la guerre en 1914. III. La victoire de la Marne : *Malleterre* (*Général*). L'Allemagne et le Droit des gens : *Dupuis* (*Charles*). A propos de la taxation des vivres en Allemagne : *A. M.*

ITALY—

Giornale degli Economisti e Rivista di Statistica—

March, 1916—Penomeni economici della guerra : *Pantaleoni* (*Maffeo*). Problemi finanziari della guerra : *Cabiati* (*Attilio*). Luigi Perozzo : *Bodio* (*Luigi*). Alcuni dati sul rincaro dei viveri.

April, 1916—Per un indirizzo di legislazione idroelettrica : *Ruini* (*Meuccio*). Oscillazioni dello sconto e dei prezzi : *Bresciana-Turroni* (*C.*). La politica commerciale italiana e i suoi effetti sull'economia nazionale : *Fraschetti* (*Armando*). Alcuni dati sul risultato dei prestiti nazionali del 1915 nelle varie regiono italiane. Dati sul costo dell'alimentazione.

La Riforma Sociale. April, 1916—Sulle premesse economiche del contratto collettivo di lavoro. Appunti critici : *Prato* (*G.*) Tacito, Machiavelli ed i Ferrovieri : *Sella* (*E.*). I problemi dell'elettrotecnica in Italia nel presente e nell'avvenire : *Ascoli* (*M.*).

Rivista Italiana di Sociologia. January–February, 1916—Sociologia e nazionalita : *Sergi* (*G.*). Correlaziono demografiche : *Savorgnan* (*F.*). La necessità dello studio dell'economia collettiva : *Murray* (*R. A.*). I presupposti teoretici e il metodo della storia giuridica : *De Francisci* (*P.*).

DENMARK—

Nationalokonomisk Tidskrift—

January–February, 1916—Kampen om Alkoholspørgsmaalet : *Rogind* (*Sven*). Sociologi og Socialøkonomi : *Davidsohn* (*Joseph*). Økonomiske Oversigter. Danmark : *Cohn* (*Einar*).

DENMARK—*Contd.*

Nationalokonomisk Tidskrift—*Contd.*

March–April, 1916—Krigen og Prisniveauet : *Warming* (*Jens*). Statsmonopoler og Regalretten : *Birck* (*L. V.*). Postsparekasser : *Nikolaisen* (*J. B.*).

SWEDEN—

Ekonomisk Tidskrift—

December, 1915—Jordränterproblemets kärnpunkt : *Heckscher* (*Eli F.*). Den verkliga kapitalbildningen i vissa länder under kriget : *Silverstolpe* (*K. Gunnar*). Nagra anteckningar om utvecklingen af de svenska privatbankernas filialnät : *Hultman* (*Ivar*). De tyska krigslånen och de tyska besparingarna : *Silverstolpe* (*K. Gunnar*). Till fragan om penningens vårde under kriget : *D. D.*

January, 1916—Det neutrala Sverige och dess utrikeshandel : *Carleson* (*Conrad*). Taxeringen till inkomst- och fórmógenhetskatt år 1913 : *Hiojer* (*Ernst*). Englands guldforrad under kriget : *D. D.*

LIST OF ADDITIONS TO THE LIBRARY.

During the period that has elapsed since March 20, 1916, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) **Foreign Countries.**

France—

Census. Résultats Statistiques du Recensement Général de la Population effectué le 5 Mars. 1911. Tome ii. Population présente. Résultats par Departement. 714 pp., 4to. 1915. (Statistique Générale de France.)

Norway—

General. Rapports des préfets sut l'état économique et social des préfectures pendant la période de 1906 à 1910. Vols. 1 and 2. 8vo. 1915. (Bureau Central de Statistique.)

Births, &c. Aperçu général du mouvement de la population en Norvège pendant les années 1901 à 1910. 8vo. 1915. (*Id.*)

Census. Produktionsstatistik. (Recensement industriel 1909: Statistique de la production.) 8vo. 1915. (*Id.*)

Children. Statistique concernant le traitement des enfants moralement abandonnés. Années 1912 et 1913. 8vo. 1915. (*Id.*)

Incomes. Revenus et fortunes d'après les rôles de l'impôt communal dans les districts ruraux du Royaume pour 1911, 1912 et le 1er semestre 1913. 33 pp., 8vo. 1915. (*Id.*)

—— Revenus, fortunes et répartition de l'impôt communal d'après les rôles de 1913-14. 264 pp., 8vo. 1915. (*Id.*)

Justice. Statistique de la justice civile pour les années 1911, 1912 et 1913. 8vo. 1915. (*Id.*)

Mortality Tables. Tables de mortalité selon les expériences 1901-02—1910-11. 8vo. 1915. (*Id.*)

Christiania. Fortsaettelse av specialundersøkelse nr. iii angaaende prisbeaegelsen paa livsfornødenheter i Kristiania samt statistiske opgaver angaaende de kommunale funktionaerers forsørgelsesbyrde. 24 pp., 8vo. (Kristiania Communes.)

Spain—

Barcelona. Museu Social. Memoria dels treballs fets durant l'any 1915. 30 pp., 8vo. Barcelona, 1916. (Musea Social.)

Sweden—

Illegitimate Births. Utom Äktenskapet Födda Barn ii. 132 pp., 8vo. 1916 (Central Bureau of Statistics.)

Labour. Agriculture. Arbetartillgang, Arbetstid och Arbetslon inom Sveriges Jordbruk ar 1914. 40 pp., 8vo. 1916. (K. Socialstyrelsen.)

—— Stevedores. Hamnarbetaryket i Sverige. av K. Socialstyrelsen. 120 pp., 8vo. 1916. (*Id.*)

Mortality Tables. Dödlighets- och Livslängdstabeller för artiondet 1901-10. 71 pp., 8vo. 1916. (Central Bureau of Statistics.)

United States—

Census Bureau. Bulletin 131. Cotton Production and Distribution. Season of 1914-15. 93 pp. and maps, 4to. 1915. (The Bureau.)

Children's Bureau. Baby-week Campaigns: suggestions for communities of various sizes. Bureau Publication No. 15. 64 pp., 8vo. 1915. (The Bureau.)

—— Child Labour Legislation in United States. Bureau Publication No. 10. 8vo. 1915. (*Id.*)

(a) **Foreign Countries**—*Contd.*

United States—*Contd.*

Labour. Bulletins of Bureau of Labour Statistics. Whole Numbers:—

162. Vocational Education Survey of Richmond, Va. 333 pp. and maps, 8vo. 1915. (The Bureau.)

180. The Boot and Shoe Industry in Massachusetts as a Vocation for Women. 105 pp., 8vo. 1915. (*Id.*)

181. Wholesale Prices, 1890-1914. 275 pp., 8vo. 1915. (*Id.*)

183. Regularity of Employment in the Women's Ready-to-wear Garment Industries. 155 pp., 8vo. 1916. (*Id.*)

185. Compensation Legislation of 1914 and 1915. 408 pp., 8vo. (*Id.*)

New York (*State*)—

Department of Labour. Special Bulletin No. 75. March, 1916. Statistics of Industrial Accidents, 1914. 77 pp., 8vo. 1916. (State Department of Labour.)

—— Special Bulletin No. 76. European Regulations for Prevention of Occupational Diseases. 77 pp., 8vo. 1916. (*Id.*)

New York City—

Health. Vital Statistics. Condensed Reports (Annual). Years 1898-1915. 4 pp., 8vo. 1916. (Department of Health.)

—— Over a century of Health administration in New York City. No. 13. Monograph Series. March, 1916. 39 pp., 8vo. 1916. (*Id.*)

Exemption of Improvements from Taxation in Canada and the United States. Report prepared for the Committee on Taxation of the City of New York by Robert Murray Haig, Ph.D. 291 pp., 8vo. 1915. (The Committee on Taxation.)

Excess Condemnation. Report of the Committee on Taxation of the City of New York, with report prepared by Herbert S. Swan for the National Municipal League. 117 pp., 8vo. 1915. (*Id.*)

Probable Effects of Exemption of Improvements from Taxation in the City of New York. Report prepared for the Committee on Taxation of the City of New York by Robert Murray Haig, Ph.D. 254 pp., 8vo. 1915. Two copies. (*Id.*)

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Vol. LXXIX.] [Part IV.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY.

JULY, 1916.

The Recent Trend of Population in England and Wales.

By Sir J. Athelstane Baines, C.S.I.

[Read before the Royal Statistical Society, May 16, 1916, the President, The Right Hon. Lord George Hamilton, G.C.S.I., in the Chair.]

To discuss a trend of population may seem an anachronism at a time when it has become only too plain that, whatever tendencies may have prevailed till now, the upheaval we are experiencing will certainly have blocked the way to many of them, and diverted the rest into channels the directions of which we can at present only more or less dimly foresee. One aspect of the future was discussed in a thoughtful paper read here a few months ago by Major Darwin, and another will be presented by Mr. Nixon to-day. But before we can fully appreciate the bearing of the changes now imminent, we must bear in mind the general lines upon which population has advanced in the past, and all that I propose to do is to set forth those lines in a form which may exhibit their convergence upon the composition of the population as it stood before the war. I bring forward nothing new. All the material I use is collected from the census and the annual tables of vital statistics, and merely co-ordinated for the special object in view. Most of it is familiar to us all in some form or other, so I have confined my text to bald description, without the addition of the fragrant sauce by means of which ancient mutton is often made to pose as spring lamb. I wish, moreover, to take this opportunity of expressing my gratitude to our colleague, Dr. Stevenson, not only for the information for which I, living away from London, have been obliged to trouble him occasionally, but still more, for the remarkable improvement he has effected in some of the most interesting and valuable tables in the Annual Report of his Department, of which I have made full, and I hope profitable, use.

THE BIRTH-RATE.

My main object being to show the changes which have taken place in the distribution of the population by age and sex, the first contributory factor with which I have to deal is the basis of the population, that is, the supply of children. I take the usual starting-point, the quinquennium 1871–75, as it includes several years of great prosperity, and also leads up to the turning-point of the birth-rate after a long period of slow but continuous increase. I end off with the period 1911–14, since the vital statistics of last year, which would complete the quinquennium, are not of a comparable character, albeit, in themselves of great interest.

During the period under review, then, the population increased by about 57 per cent., but the births by no more than 5·6 per cent. The crude birth-rate did not fall below 35 per mille in the first group of years. It reached its maximum, as we all know, in 1876. By 1880, it had fallen to 34·2. In the next quinquennium 34 was never touched, nor, after 1885, was 33. The year 1891, saw 31 for the last time on the record. Between 1896 and 1899, 29 prevailed, giving place to 28, which lasted until 1905, when 27 had a short run of two years, followed by an equal term of 26 and then 25. The last year-group dealt with began with 24, but this was not attained by the rest. By far the most rapid decline was between the group 1881–85 and the next, and since 1901, also, the fall has been in progress with increasing speed.

This diminution of the birth-rate may be due to :—

(*a*) Diminution in the proportion of people of reproductive age.
(*b*) Diminution in that of the married at that age.
(*c*) Diminution of the fertility of the married, owing to :—
    (1) Women marrying later.
    (2) Voluntary restriction of births.

MARRIAGE.

As to the first question, the census of 1881, which followed closely upon the period of highest birth-rate, affords the best starting-point. By 1911, the population of all ages had increased by 38·87 per cent., but those over 15, the legally reproductive, by 51·58 per cent. Thus, the latter, who constituted 63·54 per cent. of the population in 1881, had increased to 69·37. There has been no diminution, therefore, in the area open to matrimonial adventure, so the next question is how far has advantage been taken of the augmented resources?

Here, again, the census yields information which is summarized in the table. The proportion of the married, it appears, declined until between 1901 and the last census, when a fairly marked recovery took place. How this was brought about may be inferred from the marriage-rates given in the Registrar-General's Reports. Of these, the crude rate per 1,000 of the total population may be ignored, as it takes into account both the already married and the not yet marriageable. The connubial proclivities of the community are better seen when the rate is taken upon the marriageable only, that is, upon the single and widowed over 15. This annual rate is given in the table below:—

Married per 1,000, *over* 15.

	Males.	Females.		Males.	Females.
1871 ...	559	523	1901 ...	536	496
1881	553	517	1911	545	506
1891	540	499			

	Married, per 1,000 single and widowed over 15, of each sex.			Variations per cent. (Total).
	Males.	Females.	Total.	
1871–75	63·1	53·6	57·96	—
1876–80	56·4	48·0	51·86	−10·52
1881–85	55·1	46·7	50·95	− 2·53
1886–90	52·4	44·0	47·83	− 5·38
1891–95	52·6	44·0	47·92	+ 0·19
1896–1900	54·5	45·6	49·65	+ 3·61
1901–05	52·3	43·7	47·61	− 4·11
1906–10	50·9	42·6	46·38	− 2·58
1911–14	51·9	43·4	47·12	+ 1·60

The mean number of persons married annually increased by just over 40 per cent., but the aggregate of the single and widowed from which they emerged increased by nearly 75 per cent. The high rates of the "boom" years, 1872–73, were never reached again. The return for 1915 will probably contradict this and successfully challenge the highest rates of forty years ago. This, however, is outside our present limit, within which the rate declined, with an occasional slight break, by 18·7 per cent. The women, it may be mentioned, upon whom the rate is calculated, outnumbered the men by 17·7 per cent. in the early part of the period and by 19·5 towards the end.

FERTILITY.

The reproductive ages are conventionally held to lie between 15 and 45, and, waiving the good opportunity for controversy, I adopt these limits. The proportion of this section of the population rose in the last thirty years from 44·70 per cent. to 48·00, the women more rapidly than the men. The table shows that the proportions of the married are on the same general lines as when the older population was included; they tended, that is, to fall, with a slight recovery of late. Leaving on one side the relatively insignificant number of illegitimate births, we have now to consider the distribution of the rest among the married women of reproductive age, or what is sometimes called the fertility-rate. In the table the number of these births is given per 1,000 of those amongst whom were the mothers. There was a very slight rise between the "boom" years and those of the highest birth-rate, but in the first twenty years included, the rate fell by 12·3 per cent., and from 1891 to 1911–14 the decline amounted to 25 per cent.

Married per 1,000, 15–45.

	Males.	Females.		Males.	Females.
1871 ...	474	496	1901	453	468
1881 ...	470	491	1911	458	477
1891	454	471			

	Legitimate births per 1,000 married women, 15–45.	Variations, per cent.		Legitimate births per 1,000 married women, 15–45.	Variations, per cent.
1871–75....	294·6	—	1896–1900....	242·9	− 5·96
1876–80....	296·3	+ 0·58	1901–05	230·5	− 5·10
1881–85....	282·4	− 4·69	1906–10 ...	212·9	− 7·64
1886–90...	267·1	− 5·42	1911–14	193·0	− 9·35
1891–95....	258·3	− 3·29			

It would be useful to know how far the decreased fertility in question is due to the curtailment of the period of childbearing by the later age at which women have been marrying in recent years. It is known that postponement has taken place in the case of both sexes, but the record was very incomplete before 1896. I show in the table, accordingly, the figures published from that date only. These

Mean age at marriage of bachelors with spinsters.

	Bridegroom.	Bride.	Difference.		Bridegroom.	Bride.	Difference.
	Years.	Years.	Years.		Years.	Years.	Years.
1896–1900	26·35	24·62	– 1·73	1906–10	26·93	25·14	– 1·79
1901–05	26·62	24·88	– 1·74	1911–14	27·24	25·32	– 1·92

indicate a rise in age of about 3·4 per cent. amongst the bachelor-cum-spinster bridegrooms, and of 2·8 per cent. amongst the spinsters in that arrangement. The census returns show, too, a more substantial decrease in the proportion of the married in the earlier age-groups than in the later. The falling off in the number of persons married before the age of 21 is very large, amounting to over 51 per cent. amongst men, and 38 per cent. in the case of brides. On the whole, there is evidence of a rise in the age of women at marriage sufficient to have some, though not much, influence in reducing fertility.

We must admit, however, that it is, at most, a very subordinate factor. A more general cause, assigned by some, is a cyclical character in these movements of births and deaths, the same tendency being liable to recur at long intervals in the life of a people. I am not aware of statistical support for this hypothesis ; nor do I think that physiologists now accept another theory current in the last generation, to the effect that a decline in procreative power is consequent upon an increased demand upon nerve-power, such as is entailed by modern life. The coincidence of the almost simultaneous beginning of the decline in the birth-rate in different countries, like Great Britain, Germany and the United States may fairly be traced to an origin less indefinite than the cyclic theory : nor is France so far ahead of the rest in intensive civilization that she need have been affected in the way in question more than a generation before them.

The explanation now universally accepted is far simpler. A rise in the standard of comfort, and of education which leads to the appreciation of that rise, tends surely and directly towards the voluntary restriction of the family, and takes the place of the " fear of starvation " in connoting the preventive check of Malthus, applied nowadays in a way he never advocated, and, if I remember right, distinctly reprobated in one of the later editions of his Theory.

In this country, the falling off in the birth-rate coincided with the relapse after the " boom " in the early seventies. The resources of the family began to be straitened, and gradually the restriction of the value of the wage-earner's children, by compulsory schooling and factory legislation, &c., led people to look upon a full quiver as inimical to the maintenance of the standard of living which they had once attained. The ground was well-prepared, therefore, for the propaganda of what has been since nicknamed Neo-Malthusianism, and ideas which were first current amongst the professional and more educated classes only, became widely diffused throughout the population, and are now materialized in the shop windows of every large town, and familiar in the most rural community. Possibly, too, the far wider field of gainful occupation now open to women may have had its effect upon the reluctance of wives to go through frequent confinements, and upon others to avoid matrimony altogether, except, of course, upon a strictly Neo-Malthusian basis.

One cannot help surmising, again, that the very great decline in the number of illegitimate births and their ratio to single and widowed women of the productive ages—from 16·9 per 1,000 to 7·3—is not due solely to an improvement in national morality. I may mention in passing, with the wail of the "war baby" in our ears, that in 1915 the rate was the lowest on record. Only in the first quarter was there any increase, and to connect this with the military enthusiasm of the preceding autumn is somewhat premature. The war baby, therefore, may pass into the Limbo of the phantom Cossacks, with whom so many of us talked and drank about the same time.

THE DEATH-RATE.

In spite of so pronounced a fall in the birth-rate, the population has gone on increasing considerably. This is due, of course, to a decline in the death-rate, which, for the greater part of the period in question, was more than equivalent to that in the other, and, for the first ten years, more than twice as rapid. It then came almost to a halt, but made up leeway between 1894 and 1910. Since then it has been outpaced by its rival. On the whole, as Dr. Stevenson pointed out in his last Annual Review, the mortality in 1914 among males under 35 and females under 45 was about half what it was fifty years ago. The last Life Table shows that later in life the improvement has been less marked.

I propose to deal here, however, with the mortality of the young only, practically with those under 5, upon the preservation of whom depends the amount of compensation obtainable for the relatively smaller number being now brought into the world. The toll levied by death upon these, though much lightened of late, is still heavy. During the first quinquennium here quoted, the deaths of children under 5 amounted to 40 per cent. of the total. The corresponding ratio in the last period dealt with, was only 29 per cent., but it appertains to a relatively smaller population.

Considering now the children apart from the rest, a distinction must be drawn between those who have not weathered the risks of the first year of life and the total number under 5. The latter have their death-rate taken on their total, so that it can be compared with that of the population at large, and, like it, standardized for age and sex. Owing to the uncertainty of the number living in their first year at any given period it is customary to take their death-rate upon the number of births registered during the same year. Even upon this system there have been scathing remarks passed by Dr. Bertillon, who finds loopholes in our Registration law which tend to reduce our rate. In the following table, then, the infantile mortality is given apart from that of all under 5, and the standardized rates for the whole population are added for comparison :—

	Standardized death-rates.		Variations per cent.		Deaths under 1 year.		
	All ages.	Under 5.	All ages.	Under 5.	Per 1,000 births.	Variation per cent.	Percentage on deaths under 5.
1871–75	20·9	64·9	—	—	153	—	61·9
1876–80 ...	19·8	61·9	− 5·3	− 4·6	145	− 5·2	60·9
1881–85	18·7	56·6	− 5·6	− 8·4	139	− 4·1	61·9
1886–90	18·5	56·9	− 1·1	+ 0·5	145	+ 4·3	63·5
1891–95	18·5	57·8	—	+ 1·6	151	+ 4·1	65·7
1896–1900	17·6	57·6	− 4·9	− 0·7	156	+ 3·3	68·1
1901–05	16·0	50·2	− 9·1	−12·8	138	−11·5	68·7
1906–10	14·4	41·7	−10·0	−16·9	117	−15·2	67·7
1911–14	13·5	37·3	− 6·2	−10·3	109	− 6·8	65·8
1871–1914	17·5	53·9	−35·4	−42·4	139	−28·7	64·9

What I will call the children's rate declined, it may be seen, by no more than 12 per cent. before 1885, while between 1896 and 1914 the fall amounted to 36 per cent., a movement reflected in the general rate.

The comparatively low death-rate between the years 1 and 5 can be inferred from the last column. These years include from 77 to 80 per cent. of those under 5, but only from 31 to 39 per cent. of the deaths. It will be seen, too, that the decline in the infantile rate has been slower and more irregular than that of the elder children, as well as less rapid since the general decline set in after 1896. There is no question in vital statistics to which of late closer and more studied attention has been paid than to that of infantile mortality, and medical, official and private effort is being concentrated upon it in our large cities. A considerable part of the recent decline in the death-rate is no doubt the result of this personal enterprise combined with sanitary improvements and an extended education of the household authorities in the exigencies of the situation both before and after birth. But the campaign is as yet not much more than well begun.

Some, however, would have it that a heavy death toll in the first year implies the "weeding out" of the unfit, and a consequently lessened mortality in the next few years of childhood. I have not at hand at present the material for entering into this before 1911, but the Registrar-General's tables do not seem to establish an inverse ratio of this description, and, in fact, seem to contradict it.

THE NATURAL INCREASE-RATE.

It remains to bring together the birth and death-rates in explanation of the continued increase of the population. For this purpose the crude rates are used, unstandardized, that is, as to differences in age and sex. The table below contains the relevant figures :—

	Rates per 1,000.			Variation per cent.		
	Birth.	Death.	Natural increase.	Birth.	Death.	Natural increase.
1871-75 ...	35·5	22·0	13·5	—	—	—
1876-80	35·3	20·8	14·5	− 0·56	− 5·45	+ 7·53
1881-85	33·5	19·4	14·1	− 5·10	− 7·72	− 3·09
1886-90	31·4	18·9	12·5	−12·24	− 2·58	−11·06
1891-95	30·5	18·7	11·8	− 2·87	− 1·06	− 6·21
1896-1900....	29·3	17·7	11·6	− 3·93	− 5·35	− 1·61
1901-05	28·2	16·0	12·2	− 3·75	− 9·60	+ 4·75
1906-10	26·3	14·7	11·6	− 6·74	− 8·12	− 4·70
1911-14	24·0	13·9	10·1	− 8·75	− 5·44	−12·93
1871-1914....	30·4	18·0	12·4	−32·39	−36·82	−25·18

Between the two first periods the rate of increase was pushed up almost entirely by the fall in mortality, and fell between 1881 and 1895 in sympathy with the decline in births. The death-rate reasserted its influence again until 1900, and had a retarding effect until recently, when the birth-rate descended with increased velocity, and fairly beat it by the end of the record.

THE DISTRIBUTION OF THE POPULATION BY AGE.

The census returns show the influence of the decline of the two rates upon the distribution of the population by age and sex, and enable us to form a judgment upon the results, from a national standpoint, of the changes which have been thus brought about.

The principal question to be considered here is the extent to which the rate of increase between censuses has varied at each age-period, and the figures upon which I propose to comment are set forth in the table below. It is unnecessary, perhaps, to point out that the general increase-rate here given is lower than that of the natural increase, owing to emigration.

Age-group.	Increase per cent. between				
	1871–81.	1881–91.	1891–1901.	1901–11.	1881–1911.
0–4	14·64	0·93	4·59	3·70	9·47
5–9	16·29	7·87	2·82	6·01	17·46
10–14	15·51	15·11	3·67	4·73	24·97
15–19	16·82	15·85	10·01	2·79	30·99
20–24	16·13	13·67	17·93	1·76	36·40
25–34	13·56	15·40	20·06	13·33	57·01
35–44	14·37	13·20	20·04	21·27	64·78
45–54	8·80	14·88	16·23	21·58	62·34
55–64	14·41	8·01	17·27	18·27	49·82
65—	10·60	15·48	10·57	23·77	58·04
Total	14·36	11·66	12·15	10·89	38·87

Now, the first point deserving attention is the preliminary one of the greatly increasing irregularity in the rate as between different age-groups at the same census. Taking the ten age-groups adopted for the table, it will be seen that between 1871 and 1881, the progress, except at one group, was fairly uniform all along the line, and the mean arithmetical difference of the group-figures from the general total was no more than 1·78 per cent. Between 1881 and 1891, this difference grew to 4 per cent. It increased at the next census to 6 per cent., and by 1911 to nearly 8. It may be noted that after 1871–81, there is a certain uniformity in the distribution of these irregularities, which increase in intensity only. That is, in every series there is one main break in the rate, from a lower to a much higher increase, and this break occurs at a later age at each census. In the 1881–91 column, for instance, the break occurs between the 2nd and 3rd group; ten years later, between the 4th and 5th; and by 1911, it has got down to between the 5th and 6th. The irregularity, in fact, is due to the relatively slow increase-rate at the younger ages and the more rapid growth of those over 35. In connection with the marriageable, I had occasion to mention the higher rate of increase amongst those over 15 as compared with that of the population as a whole. The following re-grouping will show this point and the lagging of the rate in early life :—

	Increase per cent. between				
	1871–81.	1881–91.	1891–1901.	1901–11.	1881–1911.
0–14	15·44	7·43	3·67	4·79	16·71
15—	13·75	14·08	16·73	13·82	51·58
15–24	16·49	14·80	13. 75	2·28	33·57
25–44	13·91	14·44	20·01	16·76	60·41
45—	10·94	12·87	15·14	21·09	57·37

The continuously increasing divergence of the rates under and over 15 up to 1901 will be noted. The nearer approximation which is manifest in 1911 is only due to the wave of decline having by then reached the earliest and largest decennial group of the elder population. If, indeed, an adjustment be made so as to include, in 1901, the large number of adults then absent on foreign service, as has been done by the Registrar-General, the slight increase in the 20–24 group at the last census would be converted into an almost equivalent decrease, and that in the age-group following it would be reduced by 20 per cent. There is no reason to assume that the wave in question has spent its force since the last census, and that the decline in the birth-rate in which it originated will not itself be stimulated by the increasing paucity of those of the most productive age, which has hitherto been its result. The changes above indicated have been illustrated by the absolute figures of population, but they can be better appreciated when those figures have been reduced to a proportional form. In the following table accordingly, the distribution is given upon a base of 10,000 :—

Age.	Number per 1,000.					Variation per cent.			
	1871.	1881.	1891.	1901.	1911.	1881–91.	1891-1901.	1901–11.	1881-1911.
0–4	1,352	1,356	1,225	1,142	1,068	– 9·7	– 6·7	– 6·5	–21·2
5–14	2,260	2,290	2,282	2,100	1,995	– 0·3	– 8·0	– 5·0	–12·9
15-24	1,843	1,877	1,930	1,958	1,805	+ 2·8	+ 1·4	– 7·8	– 3·8
25–34	1,471	1,460	1,509	1,616	1,651	+ 3·4	+ 7·1	+ 2·2	+13·1
35–44 ...	1,132	1,132	1,148	1,229	1,344	+ 1·4	+ 7·1	+ 9·4	+18·7
45–64 ...	1,470	1,427	1,433	1,489	1,616	+ 0·4	+ 3·9	+ 8·5	+13·2
65—	472	458	473	466	521	+ 3·3	– 1·5	+11·8	+13·8
0–14	3,612	3,646	3,507	3,242	3,063	– 3·8	– 7·6	– 5·5	–16·0
15–44	4,446	4,469	4,587	4,803	4,800	+ 2·6	+ 4·7	– 0·1	+ 7·4
45—	1,942	1,885	1,906	1,955	2,137	+ 1·1	+ 2·6	+ 9·3	+13·4

From the columns showing the difference between the censuses it will be seen that people over 45 years old rose in their relative position by 252 places, or 13·4 per cent., since 1881; but a poor compensation for the descent by 16 per cent., 583 places, of those under 15, especially as a considerable part of the rise amongst the elders is at the expense of the all-important group 15–44, the progress of which, after profiting up to 1901 by the abasement of the young, was brought to a halt in 1911 by the increasing preponderance of the elders, added to the slow recruitment from below.

The disturbing fact is that the population is growing older not so much by the increasing longevity of its older constituents as by the decreasing reinforcements of its youth. Up to the beginning of the century, the result was the relative increase of men and women in the prime of life with a low mortality, but, as just stated, people are passing beyond that period, while the number entering it has diminished enough to lower materially the proportion of its first ten years. Furthermore, the figures show that the decreasing supplies have begun to affect the population between 25 and 35, when reproductive energy is at its height. Thus, the declining birth-rate is not only restricting the supply of the young, but it is tending to raise the death-rate by increasing the influence on the balance of population of persons of the age at which mortality is constantly increasing.

To revert to the margin of births over deaths, which has for several years been growing narrower. The ideal condition is, of course, to maintain or raise the rate of natural increase with the least possible expenditure of life. The births may fall off in number, but if an equivalent number of those born be raised to maturity, the decrease is immaterial. Unfortunately, the death-rate cannot be reduced below a certain proportion of the living, while the birth-rate can, and 23 per mille is a rate approaching dangerously near the limit below which a substantial rate of increase cannot be expected in the conditions of life imposed by our climate and industrial circumstances. In France, where this rate is at its minimum, and prosperity, before the war, was more widely diffused than almost anywhere else, the circumstances are very different: but even there the public danger run by regarding the increase of population from an exclusively national standpoint, and ignoring the position of the country as a unit amongst nations, has been the theme of almost innumerable warnings by statesmen and economists. In our own case, with the greatly improved chance of living 5 years shown in the last Life Table, what would have been the supply of young men of 20 now, had the birth-rate kept the supply of those under 15 at the last census up to the proportions of 1881?

SEX-DISTRIBUTION.

But, now, how about the other sex? They were given a short innings just now, in connection with the birth and marriage question, but, as was then shown, these are only a part, and now a diminishing part, of their functions in the community. In regard to the composition of the population and its recent changes, which we are now considering, the distribution by sex is of increasing importance, second only to that by age.

To begin at the beginning—more boys are born than girls. The mean proportion during the period with which we are concerned was 1,037 boys to 1,000 girls. The figure of 1,043 has been touched twice, once being in 1915, a fact which raises some interesting questions, but not in this paper. The proportion once fell to 1,032, but on the whole, there was remarkably little deviation from the average. This average is considerably lower than in most of the neighbouring countries, and the difference is attributed, again by a distinguished French statistician, to loopholes left open by our Registration law. It may be thought, accordingly, that the slight rise which has recently taken place is due to the stricter regulations now more widely in force. The question of sex at birth has been much discussed, often on far too narrow a field of observation, and no conclusions regarding it have as yet been generally accepted. To whatever cause this initial advantage in numbers may be due, the advantage itself is lost by the boys in a comparatively short time, and thereafter the excess is on the spindle side, and, if we discount the effects of emigration, tends to increase with age. This is attributable, for the most part, to the generally lower mortality of females, again with a short exceptional period. The Registrar-General now publishes the proportion of male to female deaths standardized as to differences in age-constitution between the sexes, and from this table it appears that while the proportion showed an irregular rising tendency during the first 20 years of the period under consideration, it was not until after 1891–95 that it reached the average of 1,174 to 1,000, and began to increase rapidly to between 1,203 and, approximately, 1,234, in 1915. The new Life Table, too, shows a much greater decrease in the mortality of women than in that of men between the ages of, say, 25 and 55.

The net result is that the proportion of females in the total population has risen from 1,054 per 1,000 males in 1871 to 1,068 in 1911. Between the latter date and 1901 the ratio seems to have been stationary, but it was probably a good deal lower in 1901 than is shown at the census, owing to the absence of many men in South Africa, and the fact that there had been little emigration in the 10 years since 1891.

The next point is the age-distribution of this excess of women. Those in excess over 65 have increased their proportion to the whole over 15 from 15 per cent. in 1871 to nearly 22 per cent. at the last census. The proportion of the excess between 45 and 64 shows a slightly falling tendency since 1881, and now stands at 22·5. The large group between 15 and 45 years old varied between 54 and 55 per cent., except in the special circumstances of 1901, and it also reached 63 per cent. in 1871, for which I have no explanation at hand.

The sex-proportions at different ages are set forth in the following table :—

Females per 1,000 *males.*

	1871.	1881.	1891.	1901.	1911.
0–14	997	1,002	1,006	1,003	998
15–24	1,055	1,048	1,063	1,067	1,062
25–34	1,102	1,083	1,096	1,114	1,103
35–44	1,089	1,074	1,066	1,068	1,074
45–64	1,082	1,112	1,117	1,103	1,096
65—	1,191	1,219	1,263	1,296	1,321
Total	1,054	1,055	1,064	1,068	1,068
15-44	1,079	1,066	1,075	1,083	1,080
Over 15	1,088	1,086	1,097	1,101	1,100

It merely gives numerical expression to the comments made above. The tendency is for the proportion to increase with age, after 15, subject to an interruption between the ages of 25 and 35, when the ratio is raised abnormally by emigration of men or similar movements. The slight excess of boys over girls in 1911 was chiefly amongst children under 5.

The actual figures of the excess of women over 15 rose from 608,463 in 1871 to 1,190,487 in 1911, but the percentage upon the total number of women above that age only rose from 8 at the two earlier enumerations to 9 at the last two, the 1891 figure standing in the middle, at 8·8.

In order to appraise more fully the character of the above inequality in the numbers of the sexes, it should be considered in relation to marriage. In the table the net excess of women over

	Percentage on total excess of				Percentage on total excess of		
	Spinsters.	Wives.	Widows.		Spinsters.	Wives.	Widows.
1871	10·24	10·72	79·04	1901	24·00	10·06	65·94
1881	8·44	8·94	82·62	1911 ...	25·79	11·30	62·91
1891	18·85	7·50	73·65				

15 is rateably distributed between the excess of spinsters over bachelors, wives over husbands, and widows over widowers. The most prominent features in the proportions are, first, the huge preponderance of widows, and the extent to which it has diminished. Secondly, the growth of the excess of the single. Since 1881, the proportion of widows in excess has dropped by 23·8 per cent., whilst that of spinsters similarly situated has risen by 20·5 per cent. The rise in the relative excess of wives in 1911 is apparently due to the greater prevalence of older husbands, as instead of ceasing, as usual, at the age of 25–34, the excess was then prolonged slightly into the next period, whilst the deficit in wives above that age was considerably reduced relatively to the excess below it. A similar prolongation is noticeable in the 1871 figures. The widows are the only class who are in excess at every period. The inequality in the sex-numbers divides, on the whole, at the period 25–34 in the case of both wives and spinsters. Below this age, the former are in excess and the latter, of course, in defect, while above it the case is the reverse. There are exceptions at some of the censuses, so the net result for the whole class is all that can be shown in a proportional form.

Of the facts brought to light by the above figures the one of the greatest social interest, no doubt, is the relative rise of spinsterhood, with which I can only deal summarily here. The proportion of the married, as I have already shown, has fallen to some extent, so has that of the widowed. It is that of the single that has risen, and more in the case of women than in that of the other sex, as indicated in the following table :—

Unmarried per 1,000 *at each age-group.*

Age.	Men.					Women.				
	1871.	1881.	1891.	1901.	1911.	1871.	1881.	1891.	1901.	1911.
20–24	767	777	806	826	857	652	665	701	726	757
25–34	316	317	343	359	385	295	292	326	340	355
35–44	137	138	147	158	168	156	154	164	185	196
20–44	371	376	395	410	416	340	344	372	389	393
45–64	94	91	94	102	112	116	115	118	128	148
65—	79	77	73	74	80	102	104	107	111	121

At the first age-group, the proportion of men rose in the forty years by 11·7 per cent., and that of women by 16·1, owing, perhaps, to a change in the age at marriage. Between 25 and 35, the increase in the proportions was greater in both cases, but higher amongst the men than among the women. At the next period, however, when the proportion increased at a still higher rate, it was 22 per cent. in the men's case and over 25 in the other. Between 20 and 45, therefore, the bachelor's proportion increased by 12 per cent., and that of the spinster by 15·6.

It is fortunate, in view of the relatively more rapid increase of women, and the decrease in the proportion of them that are married, that the field of employment has been greatly extended of recent years, and extended not only in the variety but in the quality, also, of their occupations. There is, however, as pointed out last year here by Dr. Snow, a considerable body of unemployed single women of the productive ages, the majority of whom, though now engaged possibly on work connected with the war, may not find permanent occupation under the otherwise happier auspices of the future. For these he thought the Dominions afforded an outlet beneficial alike to themselves and to the country receiving them, and he estimated that about half a million might be spared for this enterprise. The figure is perhaps too high, and it does not include the legion of mature widows who still constitute the bulk of the excess of their sex. It is, nevertheless, a solution more palatable than one recently proposed for Germany after the war by one of her numerous learned professors, which is, to let loose from the army a select and certificated body of eligible polygamists, who would be respectively provided with an equally attested harem.

To sum up :—In the last forty years, the proportion of people of an age to marry has materially increased, but they marry less and later in life, and thus, to some extent, cause a reduction in the number of births. The main cause of the falling birth-rate, however, is the decline in the fertility of the married due to the voluntary restriction of childbearing, a decline which has been especially rapid since the beginning of the century. The effects of the fall in the birth-rate have been neutralized, until within the last few years, by a still greater fall in the death-rate. The improvement has not been so marked amongst the very young and the old as at adolescence and in the prime of life. While, therefore, the rate of natural increase has diminished less than the fall in the birth-rate would indicate, it has been maintained at the expense of the young.

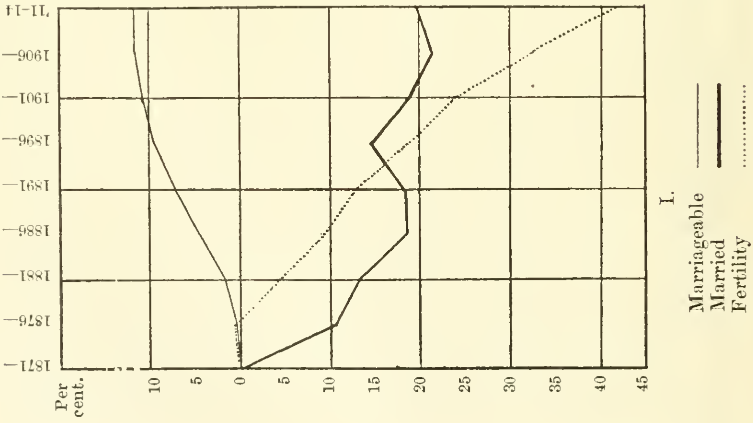
As the proportion of infants with a high mortality decreased that of the ages of low mortality increased. The death-rate went down, and the balance of population became economically favourable. But as the supply of infants diminishes relatively to the rest of the community, and their elders pass from their prime into the time of life when mortality is heavy, the proportionate supply of potential parents of the most prolific ages tends to decrease, the birth-rate falls more rapidly, and the death-rate begins to rise, leaving the margin of natural increase alarmingly narrow. The result is an older and less vigorous people ; and as the vitality of women is greater than that of men, more of the former sex reach maturity, and they last longer, so that a relatively small and probably wholesome numerical superiority at the working ages is converted into a growing preponderance of old women in the vale of life.

Rate-Variation per Cent. between Quinquennia.

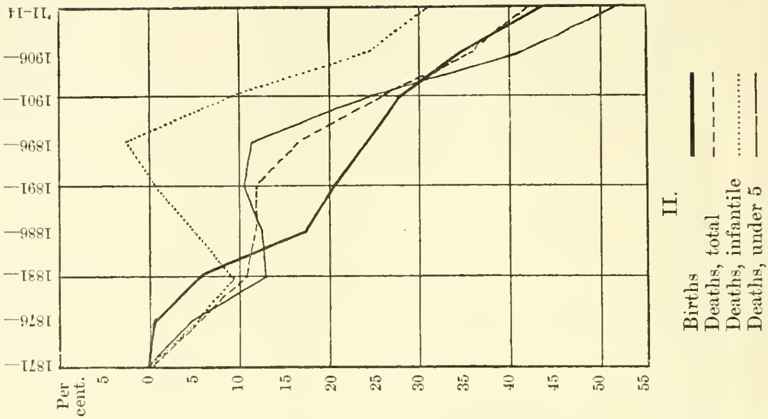
APPENDIX.—*Proportional figures illustrated by the diagrams.*

	Subject.	1871–75.	1876–80.	1881–85.	1886–90.	1891–95.	1896–1900.	1901–05.	1906–10.	1911–14.
Diagram I.	1. Marriageable: Percentage on total population of single and widowed, over 15, of both sexes	29 ·49	29 ·59	30 ·02	30 ·83	31 ·61	32 ·39	32 ·82	32 ·95	33 ·06
	2. Marriage-rate: Annual marriages per 1,000 single and widowed, over 15, of both sexes	57 ·96	51 ·86	50 ·55	47 ·83	47 ·92	49 ·65	47 ·61	46 ·38	47 ·13
	3. Fertility-rate: Legitimate births, per 1,000 wives, 15–44	294 ·6	296 ·3	282 ·4	267 ·1	258 ·3	242 ·9	230 ·5	212 ·9	193 ·0
Diagram II.	4. Birth-rate, per 1,000 total population	35 ·5	35 ·3	33 ·5	31 ·4	30 ·5	29 ·3	28 ·2	26 ·3	24 ·0
	5. Death-rate, per 1,000 total population (standardized)	20 ·9	19 ·8	18 ·7	18 ·5	18 ·5	17 ·6	16 ·0	14 ·4	13 ·5
	6. Infantile mortality: Deaths under 1 year, per 1,000 births	153	145	139	145	151	156	138	117	109
	7. Child-mortality: Deaths of children under 5, per 1,000	64 ·9	61 ·9	56 ·6	56 ·9	57 ·8	57 ·6	50 ·2	41 ·7	37 ·4
Diagram III.	8. Spinsters: Percentage of single women over 15 on all women over 15	36 ·23	36 ·55	37 ·17	38 ·11	38 ·78	39 ·23	39 ·34	39 ·07	38 ·57
	9. Wives: Annual marriages per 1,000 single and widowed women over 15	53 ·6	48 ·0	46 ·7	44 ·0	44·0	45 ·6	43 ·7	42 ·6	43 ·4
	10. Illegitimacy: Illegitimate births per 1,000 single and widowed women, 15–44....	15 ·9	14 ·4	13 ·5	11 ·8	10 ·1	9 ·2	8 ·4	8 ·1	7 ·9
Diagram IV.	11. (Birth-rate as in 4)	—	—	—	—	—	—	—	—	—
	12. Death-rate: Per 1,000 of total population	22 ·0	20 ·8	19 ·4	18 ·9	18 ·7	17 ·7	16 ·0	14 ·7	13 ·9
	13. Natural-increase-rate: Excess of births over deaths per 1,000 of population	13 ·5	14 ·5	14 ·1	12 ·5	11 ·8	11 ·6	12 ·2	11 ·6	10 ·1

Rate-Variation per Cent. between Quinquennia.



I.



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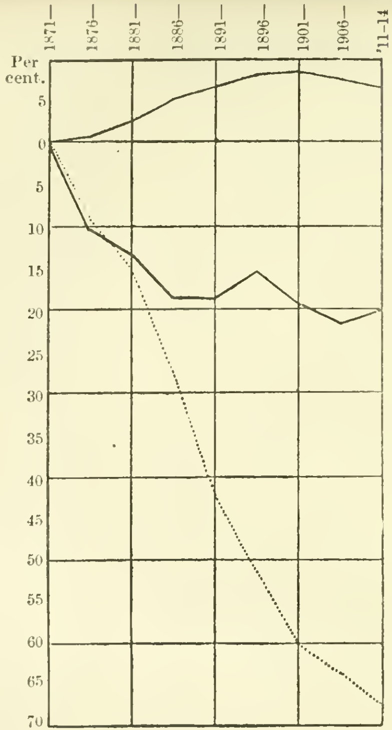
Rate-Variation per Cent. between Quinquennia.



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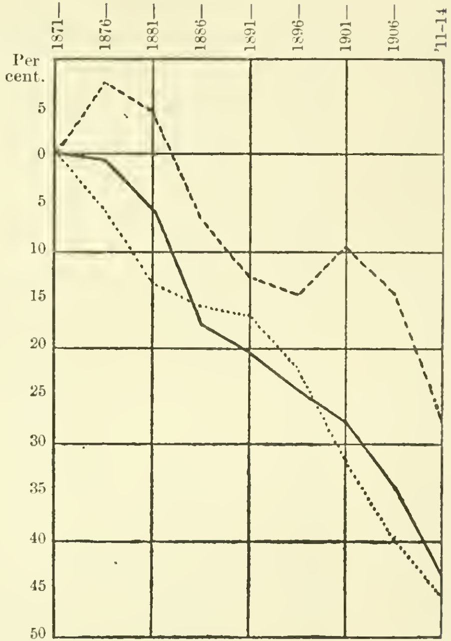

IV.

WAR AND NATIONAL VITAL STATISTICS WITH SPECIAL REFERENCE TO THE FRANCO-PRUSSIAN WAR.

By J. W. NIXON, B.Sc.

[Read before the Royal Statistical Society, May 16, 1916, the President, The Right Hon. LORD GEORGE HAMILTON, G.C.S.I., in the Chair.]

1. THIS Paper consists chiefly of an attempt to trace the effect of the Franco-Prussian War upon the vital statistics of France, Prussia and neighbouring neutral States. Such subjects as mortality and sickness among troops, rates of recovery of wounded, &c., which I call for short, "direct" effects of war, are excluded, and I have confined myself to what I call "indirect" effects. I propose to ask how the civil population is affected in such matters as mortality, fertility, illegitimacy. Are the marriage-rate and infant mortality affected, and does the proportion of male births rise? It is not always possible to distinguish between these direct and indirect effects, especially among the male population. In the case of females, however, the direct effects are nil and hence, in the sections which follow, I have always where possible distinguished males and females.

2. I limit myself to the Franco-Prussian War in the first place because it was necessary to have statistics not only ample but also reliable—a condition which rules out the greatest of all past wars, the Napoleonic wars of 100 years ago; secondly, because it was advisable to choose a war which was waged at home—a condition which rules out the Crimean War and Indian Mutiny; and, thirdly, because it lasted sufficiently long to show definite effects—a condition which rules out the Austro-Prussian War which only lasted three months.

3. A concluding section deals with the present war. But this is only brief and incomplete, as figures, especially for enemy countries, are not yet available, and because the subject could be more satisfactorily dealt with in a separate paper when the war is ended.

4. The years I have taken are generally the three years preceding and the three years following the war, thus showing pre-war, war and post-war conditions. A longer period would have been more satisfactory, but in order to avoid the tables becoming unduly large

I have kept them to the six years 1868–73. For most of the charts, however, I have extended the figures both ways and show the fifteen years 1863–77.

I. MORTALITY.

5. I will take the effect of the war on mortality first. The total number of deaths in France[1] and Prussia for the six years 1868–73 is given in the following table. Stillbirths are excluded in both cases.

TABLE I.—*Gross Number of Deaths. France and Prussia*, 1868–73.

Year.	France.	Prussia.	Year.	France.	Prussia.
1868	922,038	658,756	1871	1,271,010	708,499
1869	864,320	632,197	1872	793,064	724,944
1870	1,046,909	665,987	1873	844,588	698,553

6. These figures include all deaths, civil and military, registered during these years, and to obtain the number of deaths among the civil population we must deduct the "military" deaths. For Prussia this is simple, for its vital statistics always show the civil and military population separately, except for 1870 and 1871, when the total deaths are given separately, but distribution by ages, months, &c., is given for the civil population only. In the case of France we have no complete figures. The number of "military" deaths registered was 94,329 (33,164 in 1870 and 61,165 in 1871), but these returns are notoriously defective, and various estimates have been made of her total losses. Von Fircks[2] states that the above figure should be increased by at least 60,000. He, however, is not an unbiased authority. The defectiveness in the returns is not, I think, of great importance for our purpose, for the total number of deaths registered being the sum of the civil and military deaths, by deducting the latter, however incomplete they may be, we should get the correct number of civil deaths. I have, therefore, deducted from the total number shown in Table I, 33,164 and 61,165 for 1870 and 1871 respectively to get the net number of civil deaths. These are shown in the following two tables distinguishing males and females, and giving the rates per 1,000 of the estimated population living in those years. No official figures appear to be available as to the estimated populations by sex, so to calculate the rates for

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[1] It might be stated here that throughout this Paper, figures for Alsace-Lorraine are excluded from all statistics relating to France.

[2] Von Fircks, *Die Volkskräft Frankreichs und Deutschslands.* Berlin, 1875.

males and females, estimates were made based on the Prussian Census of 1871 and the French Census of 1872.[3]

TABLE II.—*Number of Deaths among Civil Population of France and Prussia*, 1868–73.

Year.	France.			Prussia.		
	Males.	Females.	Total.	Males.	Females.	Total.
1868 ...	471,227	450,811	922,038	341,418	317,310	658,728
1869	442,988	421,332	864,320	327,244	304,944	632,188
1870	519,873	493,872	1,013,745	332,250	307,807	640,057
1871	631,068	578,777	1,209,845	360,235	339,790	700,025
1872	409,811	383,253	793,064	372,941	351,914	724,855
1873	433,804	410,784	844,588	363,862	334,504	698,366

TABLE III.—*Death-rates per* 1,000 *of the Population.*

Year.	France.			Prussia.		
	Males.	Females.	Total.	Males.	Females.	Total.
1868	25·7	24·4	24·9	28·8	25·9	27·4
1869	24·1	22·8	23·5	27·4	24·7	26·0
1870	28·2	26·6	27·5	27·6	24·7	26·1
1871	34·7	31·6	33·4	29·8	27·2	28·4
1872	22·8	21·2	22·0	30·7	27·9	29·3
1873	24·0	22·6	23·3	29·7	26·3	28·0

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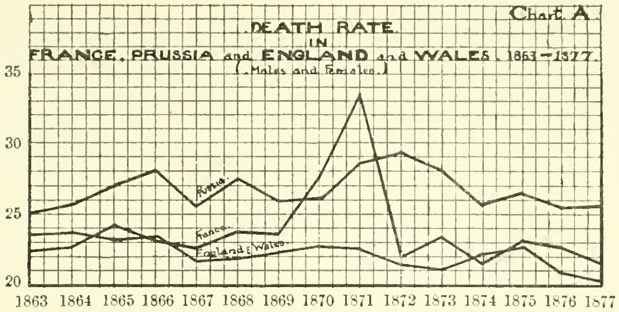
[3] It is of interest to compare here the French losses with the Prussian. For Prussia an elaborate account was published by Dr. Engel (*Die Verluste der Deutschen Armeen in Officieren und Mannschaften im Kriege gegen Frankreich* 1870–71—Prussian Statistical Bureau, 1874), which gave the total German losses as follows :—

Killed	17,572
Died of wounds	10,710
Died of sickness	11,184
Others	1,415
Missing	4,009
	44,890

Of these about 35,000 were among Prussian Army Corps. The total strength of the German Army averaged about 900,000 (Prussian, 700,000). Certain tables given in the publication enable these losses to be apportioned at about 26,000 in 1870 and 9,000 in 1871. The French registered losses were 94,300, of which the great majority occurred in the second year of war, whereas nearly three-quarters of the German losses occurred in the first year.

7. The death-rates for the longer period of fifteen years are shown on the following chart :—

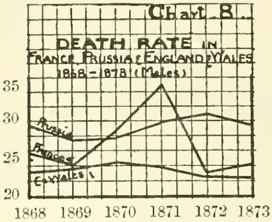


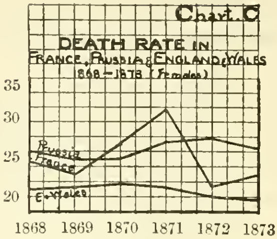
Prussia's death-rate is normally higher than that of France, while that of England and Wales was slightly less. In peace times the French and Prussian death-rates fluctuated fairly closely, but in the period 1869–73 there is a big divergence. France shows a large rise in 1870 and a further enormous rise in 1871, whereas the rise in the Prussian death-rate was in the years 1871 and 1872—a year later. Most noticeable is the recovery of the French death-rate in 1872; falling from 33·4 per 1,000 to 22·0 per 1,000, lower than any period before the war. Prussia's death-rate showed no such recovery, but continued high in 1872 and 1873. This high rate was, however, largely due to a small-pox epidemic which broke out in 1871. The number of deaths from small-pox in the period 1869–73 was as follows :—

	1869.	1870.	1871.	1872.	1873.
Number of deaths from small-pox. Prussia	4,638	4,470	56,826	65,109	9,939

Deaths from this cause alone amounted to 8 per cent. of the total deaths in 1871 and 9 per cent. in 1872, and these would largely account for the rise in the death-rate from 26·1 in 1870 to 28·4 in 1871 and 29·3 in 1872. As Prussia is the only foreign country which gave its total deaths analysed by causes, it is not possible to investigate the rise for other countries.

8. The figures of Table III showing the death-rate for males and females separately for the six years 1868–73 are shown in the following charts :—





9. From these, it will be noticed that the male and female curves show very similar features for all the three countries, and without exception the male death-rates are higher than the female. In both France and Prussia the female death-rate rose and fell to almost the same extent as the male. Taking the year 1868 as a standard year in which the death-rate was normal, the rise in the number of civil deaths was, in 1871, for France 33·9 per cent. for males and 28·4 per cent. for females; for Prussia 5·5 per cent. and 7·1 per cent. respectively. Thus the male death-rate rose in greater proportion than the female for France, but the reverse was the case for Prussia.

10. It is interesting to compare the number of deaths in 1868–69, two years of normal mortality in peace time, with the number in 1870 and 1871, the two years of war. The following is the result :—

	France.	Prussia.
Civil deaths in 1868–69	1,786,358	1,290,916
Civil deaths in 1870–71	2,223,590	1,340,082
Increase	437,232	49,166
Increase per cent.	24·4	3·8

In both cases the number of civilian deaths is greater than the number of military deaths. In the case of France, the "indirect" effects of war enormously exceed the "direct" effects. France, of course, was the beaten country and endured the trials and privations of invasion and siege. How the two capitals fared during the war may be seen from the following table :—

TABLE IV.—*Deaths registered in Paris and Berlin*, 1868–73.

	Paris.				
	1868.	1869.	1870.	1871.	1872.
Males	24,166	23,969	40,126	50,445	21,331
Females	22,962	21,943	33,464	36,436	19,985
Total	47,128	45,912	73,590	86,881	41,316

	Berlin.				
	1868.	1869.	1870.	1871.	1872.
Males	13,127	12,123	13,801	17,063	14,865
Females	11,715	10,535	11,693	15,268	13,236
Total	24,842	22,658	25,494	32,331	28,101

11. The number of deaths in Paris rose from 45,912 in 1869 to 73,590 in 1890 and 86,881 in 1871—almost double. For Berlin, the number rose from 22,658 in 1869 to 25,494 in 1870 and 32,331 in 1871—a rise of 43 per cent. The siege of Paris at the end of 1870 and the beginning of 1871 was the cause of terrible distress among the civil population.

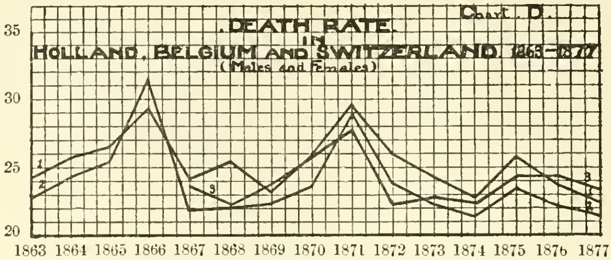
12. *Neutral Countries.*—We now consider certain states which were neutral during the war. I have selected England and Wales as the chief neutral State, and Belgium, Switzerland and Holland as three contiguous countries. The death-rates, distinguishing sex, in the years 1868–73 are shown in the next table.

TABLE V.—*Death-rates in certain neutral countries*, 1868–73.

	Belgium.		Holland.		Switzerland.		England and Wales.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1868	22·4	21·5	26·3	24·7	23·3	20·9	23·1	20·7
1869	22·5	21·8	23·6	22·5	25·2	22·5	23·6	21·0
1870	24·2	23·2	26·6	25·1	27·0	24·5	24·2	21·6
1871	29·8	28·2	30·4	28·6	30·2	25·3	23·9	21·3
1872	24·5	23·1	26·9	24·9	23·8	20·8	22·7	20·0
1873	22·8	21·3	25·1	23·3	24·1	21·6	22·4	19·8

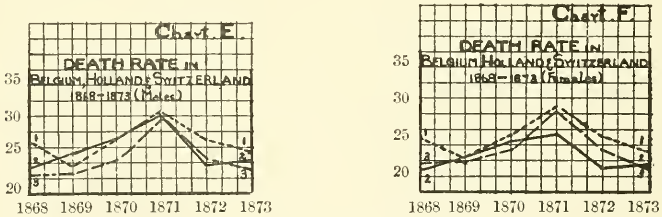
13. The total death-rate is shown on the following chart for the extended period of fifteen years as in Chart A. No figures are

available for Switzerland before 1867. To avoid confusion the rates for England and Wales are placed on Chart A.



1. Holland. 2. Belgium. 3. Switzerland.

14. England and Wales was apparently unaffected by the war. The death-rate rose slightly in 1870 and 1871, but higher death-rates were experienced in 1863, 1864 and 1865. With Holland, Switzerland and Belgium, however, we see a marked effect very similar to the course of mortality in France. The number of deaths in Belgium rose more in proportion than those of France, and those of Switzerland and Holland by almost as much. Belgium suffered more perhaps because of its being nearest to the theatre of war and on account of its industrial character. The number of deaths in 1871 was 35·4 per cent. higher than the year 1868 (*cf.* France, 31·2 per cent.). The death-rates for males and females separately, set out in Table V, are shown graphically on the next charts (for England and Wales on the previous charts B and C).



1. Holland. 2. Switzerland. 3. Belgium.

Again, the parallelism of the male and female curves especially in the case of England and Wales, Holland and Belgium is noticeable. The male death-rates are again higher than the female.

15. It will be noticed from Chart D that in 1866 there was also a peak in the death-rate curve. This was the year of the Austro-Prussian War. Both Belgium and Holland show a much larger

rise than Prussia itself (Chart A). There are no statistics as to causes of deaths for these countries, so it is impossible to analyse the rise further.

16. *Deaths by Months.*—The increase in mortality can be investigated more completely by examining the number of deaths registered in each month during these years. Unfortunately, data for both countries are not available. Monthly deaths are given for France, but these include " military " deaths and do not distinguish sex, so " indirect " effects cannot be measured. For Prussia, complete statistics of monthly deaths among the civil population are published.

17. For reasons of space the tables are not given here, but it may be remarked that similar fluctuations occur for males as for females. For Prussia, both sexes show a rise in August, 1870 ; a short temporary rise in December, 1870, and January, 1871, compared with the corresponding period twelve months before ; a fall in February and March, 1871, and a rise again in April, 1871, which continued throughout that year, and lasted until October and November, 1872. The small-pox epidemic which broke out in 1871 no doubt accounts for most of this rise.

18. The French death-rate in 1870, before the outbreak of war, was somewhat higher than during the corresponding period of 1869. The figures during the war are not considered for the reason given above. After the conclusion of hostilities the death-rate still remained very high throughout the rest of the year. By January, 1872, a fall had set in which continued throughout the year.

19. *Deaths by Age.*—A further analysis of mortality is possible, viz., according to age. Again, we are hampered by incomplete data. For France, no figures are available for the Department of the Seine for 1870, and for Prussia the statistics of deaths were tabulated not by year of age but by year of birth. Hence the figures are not strictly comparable with those for other countries, especially at the earliest years of life. The method adopted has been to take the number of deaths in 1868 by age groups, and calculate the percentage increase in 1871 in the number of deaths in the same age group. For this period—three years only—the age distribution of the population remained fairly constant (except for males of military age) and the number of deaths in any age group can fairly be compared with the number three years before. For France the figures consist of all deaths, for Prussia civil deaths only. The following table gives the figures for France, Prussia, England and Wales and Belgium. The Department of the Seine has been excluded throughout from the French figures.

TABLE VI.—*Percentage increase in number of deaths in* 1871 *compared with the year* 1868.

Age Group.	France. (Ex. Dept. of the Seine).		Belgium.		England and Wales.		Prussia.		
	Males.	Females.	Males.	Females.	Males.	Females.	Year of Birth.	Males.	Females.
Under 1 year	3·0	5·1	19·9	22·6	3·5	2·5	Year of death	— 6·9	— 4·8
1– 4 years	38·5	27·7	51·8	54·4	— 2·9	— 0·3	1st to 4th year after Birth	1·9	1·3
5–14 ,, ...	83·6	73·9	84·6	77·3	10·7	8·7	5th to 14th ,, ,, ...	— 0·4	1·2
15–24 ,, ...	204·6	62·4	95·7	55·3	15·7	9·2	15th to 24th ,, ,, ...	12·8	17·4
25–34 ,, ...	168·2	64·1	52·0	48·7	18·3	6·9	25th to 34th ,, ,, ...	20·2	22·3
35–44 ,, ...	90·2	61·3	46·1	41·4	11·8	9·4	35th to 44th ,, ,, ...	19·2	23·1
45–54 ,, ...	50·7	45·0	33·8	28·0	9·7	11·4	45th to 54th ,, ,, ...	18·1	21·3
55–64 ,, ...	30·5	26·9	16·6	14·9	10·1	12·6	55th to 64th ,, ,, ...	15·3	15·6
65–74 ,, ...	17·8	11·3	24·1	21·8	10·5	14·5	65th to 74th ,, ,, ...	9·4	9·6
75 years	15·6	11·9	27·7	19·0	9·4	9·7	75 and above	9·2	7·0
Total	46·9	28·4	36·1	34·9	7·4	6·8	Total	5·5	7·1

20. For reasons stated above, the figures for males in the case of France must be neglected. The group "under one year" is dealt with later under "Infant Mortality," for this group is affected by the number of births. The remaining figures show somewhat diverse results. Looking at the figures for females, we note that the maximum increases are for France and Belgium in the age-group 5–14, for England and Wales in the group 35–44, and for Prussia in the period 35–44 years after birth. The lowest increases are for France, in the age-group 65–74, for Belgium in the group 55–64, and for Prussia in the group 75 and over. It might be urged, however, that the year 1868, taken as the base year, was not a year of normal mortality and that different results would be shown if another year, 1869 say, were taken as the base year. This can be tested by tracing the number of deaths in any particular age-group throughout a period of years. For this purpose, I took the age-group 5–14 years and the table in the Appendix shows for France, England and Wales, Belgium and Holland the number of deaths in the age-group 5–14 during the fifteen years, 1863–77. For all the countries concerned the year 1868 is seen to be a period of normal mortality, and the figures in Table VI may be taken as showing accurately the distribution of excessive mortality for the year 1871. It will be seen that the highest age-groups generally show the smallest increases in mortality, the highest increases being shown at periods of young and middle life. This, I think, is contrary to expectation. It is also contrary to certain definite conclusions based on the same figures, recently made in a Swiss publication. This pamphlet states that the effects of war on mortality are the greatest at the two extremes of life, and are lowest at the ages 10–14, *i.e.*, that the increases are greatest at ages of highest death-rates, and lowest at the ages of lowest death-rates. The method by which this conclusion is reached are, I think, fallacious. I have dealt with them in the footnote.[4] The effect of the war, then, was not to increase mortality

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[4] The pamphlet is entitled *La mortalité chez les neutres en temps de guerre*, by Dr. Hersch of the University of Geneva, and deals with the effect of the wars of 1866 and 1870–71 on the mortality of Switzerland and Belgium in particular in comparison with that of France. As showing the incidence of mortality on the two sexes the author seems quite sound, but in dealing with the incidence of mortality at different ages of life, his analysis is statistically quite unsound. No figures are given in the pamphlet, but he translates them into numerous diagrams, obtained by the following method. The author takes the mean number of deaths in the years 1870–71, and finds the excess in these two years over the year 1869 per 1,000 of the population living at each age-group. He thus obtains a curve which reproduces in general outline the usual U-shaped mortality curve for ages, viz., a very high death-rate at the two extremes of

to any exceptional extent in the case of old age. Was its incidence exceptionally severe at the other extreme of life? This we consider in the next section.

21. *Infant Mortality.*—Deaths of infants under one year of age are best considered in relation to the number of children born in that year, and this is the rate given by all the countries concerned, except Prussia. As no still-births are registered in England and Wales, these have been excluded throughout. The method of registration and the definition of still-births differs in various countries, and these affect the rates of mortality of live births, so that the infant mortality rates are not strictly comparable.[5] For Prussia, however, there is a further reason why the figures are not comparable, in the fact that the number of infant deaths consists not of the number dying in any year under 1 year of age, but of the number dying in the (calendar) year of birth. For France, no statistics are available for the Department of the Seine in 1870, so this Department is excluded throughout. No figures of infantile deaths are published for Switzerland. The figures are set out in the following table:—

TABLE VII.—*Rates of Infant Mortality.*

	Number of Deaths under 1 year of age per 1,000 births.				Number of infants dying in year of birth per 1,000 births.
	France.*	England and Wales.	Belgium.	Holland.	Prussia.
1868	194·5	155	145·6	223·5	166·0
1869	178·0	156	130·5	182·3	145·4
1870	203·9	160	145·4	209·5	159·1
1871	231·6	158	173·4	225·4	166·5
1872	153·2	150	145·1	212·3	167·9
1873	181·2	149	142·3	205·3	159·8

* Excluding Department of the Seine.

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life, and a low death-rate for the intervening ages. As persons over 65 had a high death-rate in 1869 and also a high death-rate in the years 1870–71, the difference between these two is likely to be much higher than the difference between the death-rates of a young age-group, *e.g.*, 15–20. By using this method of absolute increase in death-rates the author, in effect, says that a rise in the death-rate from (say) 10 to 15 per 1,000—*i.e.* a rise of 5 per 1,000—is much more serious than a rise in the death-rate from (say) 3 to 6 per 1,000—*i.e.*, one of 3 per 1,000. The former, however, is a rise of 50 per cent., the latter of 100 per cent., and these figures are the ones which should be compared.

[5] See on this point: Dudfield, *Statistical Journal*, December, 1912, p. 1 *et seq.*

22. The results bear out the inferences drawn from the tables of deaths at all ages. The infant mortality of France was seriously augmented in 1870 and 1871, but rapidly recovered in the following year; that of Prussia rose to a level very slightly above that of 1868, and remained high during 1871 and 1872. Belgium and Holland both reached their maxima in 1871. The rise in the case of Belgium was a very sudden one but, as in the case of France, the rate rapidly recovered in 1872. It is unfortunate that no figures are available for the Department of the Seine in 1870, for this Department suffered more than any other. Some idea as to its extent can be obtained from the following table, which shows for each year the infant mortality in the three divisions into which French vital statistics are divided.

TABLE VIII.—*Infant Mortality in France.*

Year.	Department of the Seine.	Urban Population.	Rural Population.	Whole of France.
1868....	162	210	173	192
1869....	149	187	174	176
1870....	*	208	202	*
1871....	349	243	227	238
1872...	136	155	152	152
1873....	151	185	180	179

* Not available.

23. In 1871, infantile mortality in the Department of the Seine amounted to no less than 349 per 1,000—over a third of the number of children born—and during the first months of 1871 it must have been much higher still. It has, in fact, been stated that hardly a single baby born during the siege of Paris survived.

II. BIRTHS.

24. I will now pass to the subject of fertility, and the treatment followed will be similar to that in the case of deaths. Throughout this section, the term " births " except where otherwise stated means " live births."

25. The number of births and the rate per 1,000 for the years 1868–73 for France, Prussia and England and Wales are shown in the next table, and the birth-rates for a longer period of fifteen years are shown on Chart G.

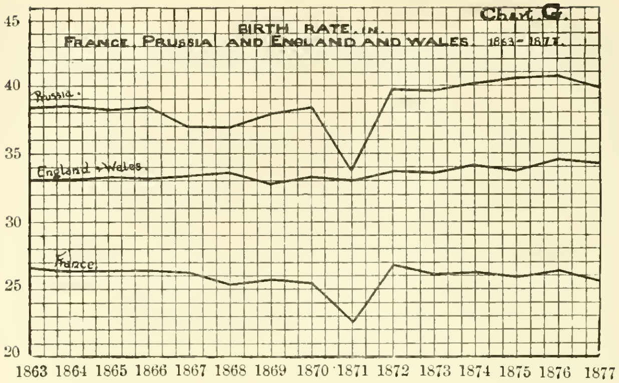


TABLE IX.—*Number of births (excluding still-births)*, 1868–73.

Year.	France.		Prussia.		England and Wales.	
	Number.	Per 1,000 Population.	Number.	Per 1,000 Population.	Number.	Per 1,000 Population.
1868	9,841	25·4	8,802	36·9	7,866	35·8
1869	9,845	25·7	9,193	37·9	7,734	34·8
1870	9,435	25·5	9,388	38·3	7,928	35·2
1871	8,261	22·6	8,234	33·8	7,974	35·0
1872	9,660	26·7	9,831	39·7	8,259	35·8
1873	9,464	26·0	9,880	39·6	8,298	35·4

Year.	Holland.		Belgium.		Switzerland.	
	Number.	Per 1,000 Population.	Number.	Per 1,000 Population.	Number.	Per 1,000 Population.
1868	1,261	35·6	1,561	31·9	791*	29·8*
1869	1,238	34·6	1,587	32·1	818*	30·8*
1870	1,300	36·2	1,645	33·0	792	29·7
1871	1,283	35·4	1,588	31·6	776	29·1
1872	1,317	36·1	1,674	33·1	803	30·0
1873	1,338	36·3	1,707	33·4	806	29·8

* Estimated.

26. France, as is well-known, is a country of low birth-rate, and during this period it was only two-thirds that of Prussia. The birth-rate of England and Wales was between the two. The chart clearly shows the sharp diminution in 1871, and a recovery in 1872 to a higher level than before the war. The birth-rate of England and Wales remained unaffected, only a very small fall having taken

place. It was seen that Prussia was hardly affected by the war in the matter of civil deaths; in the case of births, however, both France and Prussia suffered almost equally—the decline from 1870 to 1871 being 12·3 per cent. for France and 11·3 per cent. for Prussia. In the years following the war the birth-rate of Prussia seems to have been permanently augmented, the birth-rate of France resumed its normal level of about 26 per 1,000. The number of births were, of course, considerably increased immediately after the war owing to sudden increase in marriages as will be shown in the next section.

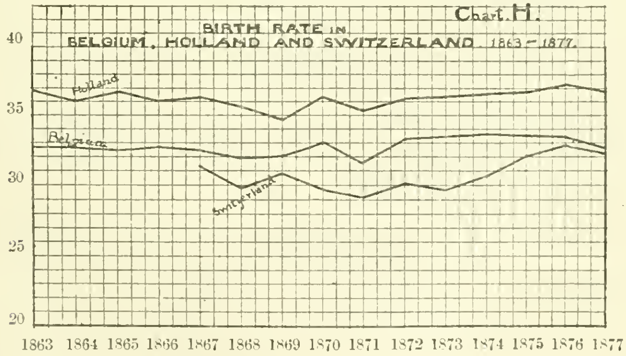
27. As in the case of deaths, I give a table showing the number of births in Paris and Berlin :—

TABLE X.—*Number of births. Paris and Berlin*, 1868–73.

	1868.	1869.	1870.	1871.	1872.	1873.
Paris	39,389	39,571	42,420	27,739	42,058	49,840
Berlin	29,220	29,539	31,766	29,159	35,500	36,104

The enormous decline in Paris in 1871, when the number of births was less than two-thirds of the number the year before, was almost entirely absent in Berlin. By 1872, the number was back at its pre-war figure in the case of Paris. In Berlin, the number of births recovered to a figure considerably above the pre-war level.

28. *Neutral Countries.*—The figures for the four neutrals have already been given in Table IX. The following chart shows the course of the birth rate for fifteen years for Belgium and Holland, and for Switzerland (from 1870). The curve for England and Wales has already been given with that of Prussia and France in Chart G.



Each country suffered a fall in 1871, but showed a recovery in 1872. The course of the birth rate in Belgium follows very closely that of

Prussia—a fall to the lowest rate of the period in 1871, followed by a recovery in 1872 to a rate substantially higher than the period before the war.

29. *Births by Months.*—Perhaps more than in the case of deaths, it is interesting to find more exactly the time when the effect of the war first showed itself. Figures are available for both Prussia and France (with the exception of those of the Department of the Seine for 1870) of the number of births in individual months. Space prevents their inclusion, but they are summarized in the next paragraph.

30. The fall in the French birth rate showed itself slightly in August, 1870. The rate remained about the same level until the middle of 1871, and fell to a minimum about November. By March, 1872, it had recovered its old level. For Prussia, the fall began, more abruptly than in the case of France, in May, 1871, and reached a minimum about October of the same year. By the beginning of 1872, it had recovered, and the number of births during the latter half of 1872 was almost exactly the same as the number in the last six months of 1869. For both countries there is a period of low birth rate for about the period six to nine months after the outbreak of war, and ceasing about five months after the conclusion of peace. Although peace was not finally concluded until May 5, 1871, hostilities had practically ceased by February, so the recovery showed itself about nine months after the cessation of hostilities. For Prussia, the period of low conception coincides very closely with the period of hostilities.

31. *Illegitimacy.*—Another aspect of the birth-rate of interest in war time is the one of illegitimacy. The exaggerated statements made during the early months of the present war as to the "torrents "of births" of illegitimate children which were to be expected are still fresh in the memory. The figures will be examined in due course in the section on the present war. For France, Prussia and England and Wales, the number of illegitimate births per 10,000 total births in the period 1868–73 is shown in the next table. This rate is not the most satisfactory measure of illegitimacy, but it is the only one available for all countries.

TABLE XI.—*Number of illegitimate births per* 10,000 *births.* (*Live-births only.*)

	1868.	1869.	1870.	1871.	1872.	1873.
France	762	748	746	716	721	746
Prussia	808	784	792	778	705	766
England and Wales....	588	578	564	562	542	520

32. In 1870, there was no appreciable change in the illegitimacy rate of either France or Prussia. In 1871, there was a decline. In 1872, it rose slightly in France and fell substantially in Prussia; in 1873, it rose in both countries. The reduction was much greater in the case of Prussia than in the case of France, probably due to the fact that during the war, numbers of adult males were absent from the country. France did not suffer any such absence of men from her country. A large proportion of the illegitimate births of France occur in Paris, and the strict law respecting prostitutes which came into operation in Paris at the beginning of the war may account for part of the French diminution. No rise in illegitimacy occurred in neutral countries, while in England and Wales, the illegitimacy rate declined each year. It cannot be said, then, that there was any increase of illegitimacy during this war.

33. *Still-births.*—Another aspect of fertility which I will briefly mention is that of still-births. It is sometimes said that the strain and shock occasioned by war would increase the number of still-births How far this was so during the Franco-Prussian War, may be judged from the next table.

Still-births are not registered in England and Wales. In France and Prussia differences in practice exist as to the registration of still-births, *e.g.*, in Prussia children born alive but dead on registration are counted as live-births, in France as still-births.

TABLE XII.—*Still-births per 10,000 total births.*

	1868.	1869.	1870.	1871.	1872.	1873.
France	449	455	457	465	435	448
Prussia	408	409	410	403	397	397
Holland	495	510	512	539	526	521
Belgium	457	449	440	436	432	436

The yearly variation in the proportion of still to live-births was no greater in war time than in peace times. France showed a small increase of 0·8 per 1,000 in 1871, a quite insignificant one. Prussia's rate remained practically the same, showing a very small decrease. Belgium shows a continuous decline. The only country showing any substantial increase in 1871 was Holland. In this country, however, the registration of still-births is very defective. It is estimated that from 15–20 per cent. of the births registered as still are live-births.[6] From none of the figures can we conclude that war has any effect on still-births.

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[6] See Dudfield, *Statistical Journal*, December, 1912, p. 65 note 4.

III. MARRIAGES.

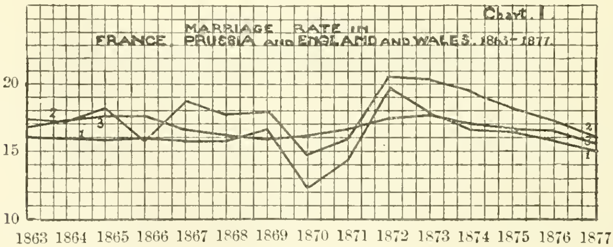
34. The third branch of vital statistics I deal with is that of marriages. The effects of war on marriages may be to increase their number, *e.g.*, among soldiers before departure for the front, what are called "war-marriages," or it may diminish their number by leading to postponements until settled times. Which factor operated most strongly during the war of 1870–71 can be seen from the following table and charts.

TABLE XIII.—*Number of marriages and marriage-rate*, 1868–73.

(00's omitted.)

Year.	France.		Prussia.		England and Wales.	
	Number.	Rate.	Number.	Rate.	Number.	Rate.
1868	301,2	15·6	213,0	17·6	177,0	16·1
1869	303,5	16·6	216,9	17·8	177,0	15·9
1870	223,7	12·0	181,5	14·8	181,7	16·1
1871	262,5	14·4	195,9	15·8	190,1	16·7
1872	352,7	19·6	255,4	20·6	201,3	17·4
1873	321,2	17·8	252,9	20·3	205,6	17·6

Year.	Belgium.		Holland.		Switzerland.	
	Number.	Rate.	Number.	Rate.	Number.	Rate.
1868	363	14·8	277	15·7	174	13·1
1869	371	15·0	278	15·6	189	14·2
1870	353	14·1	286	15·9	186	14·0
1871	375	14·9	290	16·0	195	14·6
1872	401	15·9	302	16·5	212	15·8
1873	406	15·9	317	17·2	206	15·3

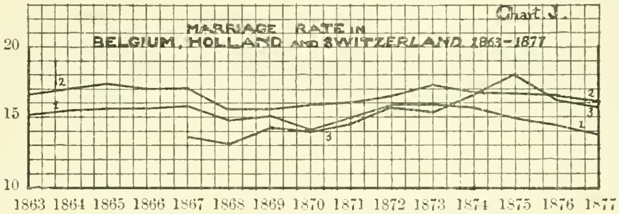


1. France. 2. Prussia. 3. England and Wales.

35. During the six years, 1868–73, the marriage rates of France and Prussia fluctuated very closely—both showing a large fall in

1870, a rise in 1871 to a very high rate in 1872, and a contraction in 1873. With France as in the case of births and deaths, the fluctuations were more violent than in Prussia. In 1870, its rate fell to 12·0 per 1,000 the lowest on record, and rose to 19·6 per 1,000 in 1872, the highest on record. In Prussia, the rates were 14·8 in 1870 and 20·6 in 1872—also the lowest and highest on record.

36. *Neutral Countries.*—The marriage rates of neutrals were hardly affected by the war. In England and Wales, the rate slowly and steadily increased each year (*see* Table XIII and Chart I). In Belgium and Holland, and in Switzerland since 1867, the course of the marriage rate is shown for the period 1868–73 on the following chart. (The numbers have already been given, Table XIII.)



1. Belgium. 2. Holland. 3. Switzerland.

37. The marriage rate of both Holland and Switzerland steadily rose during the war period. Belgium, as we have noticed in previous sections, was the neutral most affected, a decrease being shown in 1870. Also the general fall in the marriage rate which set in after 1872 in France and Prussia is noticeable in the Belgian marriage rate.

38. *Marriages by Months.*—The number of marriages in individual months is only available in the case of France, but no inference worth referring to has been deduced from them, save that the fall and recovery of the marriage rate coincided very closely with the period of the war.

IV. The Sex Ratio.

39. The theory was revived at the beginning of this war that in war time the proportion of male births rises. Numerous cases have appeared in the press in which "runs" of male births have been sent up from remote villages. Many of the statements show ignorance of the fact that male births exceed female, in peace times.[7] The

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[7] *E.g.*, *Observer* February 6, 1916, where the fact that "last week 117 male "births were registered in the High Wycombe Union and 112 females" is stated "to support a well-known theory."

theory is a very old one. In *La Marseillaise* we find words which may refer to this belief:—

> " S'ils tombent nos jeunes héros,
> La terre en produit de nouveau."

Since, however, correspondents started sending up cases of " runs " of female births, the press seems to have dropped the subject. Even the *British Medical Journal* is inclined to put some faith in the theory, for it states (November 21, 1914, p. 886) that it is remarkable that in 1857, the year after the return of our army from the Crimea, the excess of male over female births was much higher than the average of the three previous and the three subsequent years, and again immediately after the Boer War, in 1901–2, it rose above the average for 1897–1900. It fails to notice other equally large rises in the excess of males in 1884–7, 1906 and 1909, which were years of peace.

40. I will deal first with the figures of the Franco-Prussian War. The following table shows the yearly ratio of male to 1,000 female births for the years 1863–77 for France and Prussia and three neutrals:—

Table XIV.—*The sex ratio* (*i.e.*, *Number of male to* 1,000 *female births*), 1863–77.

(Note.—" 10 " is omitted before each figure, *e.g.*, 50 stands for 1050.)

	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
France	50	56	52	54	43	48	50	48	49	49	50	53	51	47	45
Prussia	49	47	53	48	50	55	56	50	53	53	52	57	61	54	54
England and Wales	47	40	40	44	43	36	42	41	35	41	39	36	43	38	34
Belgium	55	55	46	42	57	49	51	51	46	51	42	53	40	45	48
Holland	65	51	52	53	60	54	49	56	40	48	48	52	63	54	52

There is no trace here of any rise in the sex ratio. In every case (except Holland) the ratio fell in 1870, and in 1871 there was a further fall in neutrals. A slight rise was shown by France and Prussia, but both increases were insignificant. As 1870 and 1871 contained both months of war and months of peace, I give the monthly figures in the next table for Prussia (French figures not being available).

This table is based on all births, and the yearly figures, therefore, differ from those of the previous table which are based on live-births.

TABLE XV.—*The sex ratio in Prussia by months*, 1869–72.

(Note.—" 10 " is omitted before each figure.)

	Jan.	Feb.	Mar.	April.	May.	June.	July.
1869	60	58	66	54	71	67	69
1870	73	54	55	51	52	69	43
1871	69	67	59	54	53	73	58
1872	58	66	65	54	58	64	57

	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1869	72	72	54	59	62	64
1870	69	68	46	60	63	59
1871	64	46	79	62	59	61
1872	63	63	62	58	69	62

41. Again, there is no evidence of any effect of the war on these figures. The only large rise was from 1,043 in July, 1870, to 1,069 in August, 1870, but this ratio had been exceeded both before and after the war. The rise is insignificant when its probable error is considered.

42. I have applied the " theory of errors " to this question in the next section where I deal with the present war and the figures of the *British Medical Journal.*

43. The vital statistics of the Franco-Prussian War have now been passed in review, but before summarising the results I will deal briefly with the present war.

V. VITAL STATISTICS DURING THE PRESENT WAR.

44. It is yet too early to speak of the present war's effect on vital statistics. The subject would yield an interesting paper after the war is over, though the effect of such a stupendous conflict will be felt for a very large number of years to come. The war has already lasted twice as long as the Franco-Prussian War, while the number of men engaged is measured not in hundreds of thousands but in millions.

45. Few figures are as yet available. For France and Germany, scattered references from the foreign press are almost the sole source and nothing is obtainable for Russia and the smaller countries. Only for our own country are adequate data published.

46. The number of births, deaths and marriages in England and Wales, are given below for the four quarters of 1913, 1914, and 1915.

TABLE XVI.—*Deaths, births and marriages. England and Wales.*
(00's omitted.)

	Deaths.			Births.			Marriages.		
	1913.	1914.	1915.	1913.	1914.	1915.	1913.	1914.	1915.
1st quarter	146,5	146,2	177,3	216,6	217,4	221,4	60,9	51,0	55,4
2nd ,, ...	121,7	124,1	138,6	227,5	226,1	213,1	65,9	81,1	97,0
3rd ,, ...	113,4	115,6	109,4	225,5	227,1	196,5	83,6	82,0	102,6
4th ,, ...	123,2	130,9	137,1	212,3	208,3	183,4	76,1	79,9	105,0
Year	505,0	516,8	562,3	881,9	878,8	814,5	286,6	294,1	360,0

The published rates for 1915 are based on the estimated population of 1914, that for 1915 not being available. This figure is probably too high owing to the number of troops abroad, which would make the rates (both of births, deaths and marriages) too low. On the other hand, the number of deaths is diminished by the absence of deaths among the millions of soldiers which would have occurred in normal circumstances. The number of deaths may, however, be somewhat raised by the deaths of wounded in this country. As we can only regard the rates for 1915, and to some extent those for 1914, as provisional, they are not used here.

47. *Deaths.*—The rise in the number of deaths was about 10 per cent. in 1915, and was confined almost entirely to the first six months of the year. The large rise in first quarter was partly due, no doubt, to the epidemic of measles which broke out and to the very wet winter. The number of deaths in the second six months of 1915 was no higher than that of 1914. As it is possible that other than civil deaths are included, we cannot say definitely at present that the war has adversely affected mortality. There is no appreciable increase in the number of deaths in Scotland and Ireland.

48. The only figures issued as to the ages at death in 1915 are those under 1 year, 1 year to 65 years, and over 65. The numbers dying under 1 year, and over 65 years are shown in the next table.

Table XVII.—*Number of deaths under* 1 *year and over* 65 *years of age. England and Wales*, 1913–15.

	Under 1 year.			Over 65 years.		
	1913.	1914.	1915.	1913.	1914.	1915.
1st quarter	26,473	25,017	28,417	47,832	48,663	60,690
2nd ,, ...	20,129	19,890	20,735	38,404	38,630	41,749
3rd ,, ...	25,183	25,465	19,249	31,070	31,245	31,343
4th ,, ...	24,012	21,792	20,894	37,061	40,300	45,719
Year	95,797	92,164	89,477	154,367	158,838	179,501
Rate per 1,000*	108	105	110	80·3	82·5	92·4

* Per 1,000 births for infants; per 1,000 living for old persons.

The number of infant deaths shows no significant rise. The rate of infant mortality in 1915 being calculated on the number of births, it is not subject to the qualifications set out above for birth and death rates.

49. The rate rose from 105 in 1914 to 110 in 1915, the high rate in the first quarter being due to the measles epidemic. Deaths of old persons over 65 show a large increase in 1915, especially in the first quarter of 1915. The rates per 1,000 living over 65 rose from 80·3 in 1913 to 92·4 in 1915. The summer months show practically no increase.

50. Figures of deaths in France and Germany are not yet available, but figures for Paris and Berlin are given in the English "Quarterly Return," and others are found in the foreign press. The following table shows the number of deaths in Paris and Berlin 1913–15 by quarters, taken from our "Quarterly Returns" for Paris, and for Berlin partly from this source and partly from articles in *Vorwärts* (*e.g.*, July 13, 1915, and February 2, 1916).

Table XVIII.—*Number of deaths in Paris and Berlin*, 1913–15.

	Paris.			Berlin.		
	1913.	1914.	1915.	1913.	1914.	1915.
1st quarter	12,685	13,550	12,793	7,621	7,055	?
2nd ,, ...	11,861	12,031	11,219	7,133	6,493	?
3rd ,, ...	9,556	9,836	8,660	6,286	?	?
4th ,, ...	11,253	10,056	10,294	7,432	?	?
Year	45,355	45,473	42,966	28,472	29,655	28,527

We cannot infer that there has been any appreciable rise in mortality even allowing for the diminished population. Conditions in the capital, however, are not representative of the whole country. Certain figures published in France for the 77 unoccupied Departments point to a rise in the death rate there.

51. There has been a slight rise in infant mortality in Paris from 111 in 1914 to 125 in 1915. In Berlin, there has been a decline from 142 in 1913 to 120 in the last quarter of 1915.

52. The results of a special inquiry among 25 large towns in Germany were published in the *Deutscher Reichsanzeiger* of February 8, 1916. During the three months, August–October, 1915, the number of infant deaths declined by 53 per cent., while the total number of deaths declined by 26 per cent. The improvement in infant mortality thus shown is attributed to "increased efficiency of "measures of protection," as there are fewer infants to attend to, and to the very favourable weather during these months. The *Berliner Tageblatt* of February 19, 1916, gives the following rates of infant mortality (under 6 months) in Prussia :—

December, 1912.	December, 1913.	December, 1914.	December, 1915.
206	189	179	144

53. *Births.*—A general decline in the number of births has been experienced. For England and Wales (Table XVI) the fall started in the second quarter of 1915, and by the end of 1915 the numbers had declined 15 per cent. on the corresponding period of 1914. For Paris and Berlin the figures as set out in Table XIX below show a drop of 40 per cent. for Paris and 25 per cent. for Berlin on the year 1913. For London the fall is 6 per cent. The fall set in, in the second quarter in the case of Paris. The temporary fall in the last quarter of 1914 I cannot explain. I have not been able to get all the quarterly figures for Berlin.

TABLE XIX.—*Number of births in Paris and Berlin*, 1913–15.

	Paris.			Berlin.		
	1913.	1914.	1915.	1913.	1914.	1915.
1st quarter	12,699	12,574	11,456	10,649	9,480	9,362
2nd ,, ...	12,469	12,466	7,309	9,800	9,288	?
3rd ,, ...	11,776	10,868	5,734	9,727	?	?
4th ,, ...	12,610	9,281	6,078	9,887	?	6,438
Year	49,554	45,189	30,577	40,063	37,493	30,031

54. *Marriages.*—The number of marriages in England and Wales by quarters has already been given in Table XVI. In the war of 1870–1 we saw for both belligerent countries a sudden fall in the marriage rate. The present war has had a different effect. A few scattered references in the German Press show that there has been no diminution in the marriage rate. For France, I have been unable to get any figures. The marriage rate in England and Wales reached 22·3 at the end of 1915, the highest ever recorded. The rise is, of course, almost entirely due to "war marriages." The same phenomenon was experienced in Berlin for it is stated that during the first three months of war 70 per cent. of the marriages were "war marriages" (*Berliner Tageblatt,* August 16, 1915). The same newspaper for the 26th of April, 1916, however, gives the number of marriages in Berlin at 16,622 in 1915 (22,702 in 1914), a fall of nearly 30 per cent.

55. *Illegitimacy.*—The only information available is for the United Kingdom, shown in the following table:—

TABLE XX.—*Illegitimate births. England and Wales,* 1913–15.

	Number.				
	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year.
1913	Not available.				37,909
1914	9,223	9,997	9,391	8,718	37,329
1915	10,167	9,644	8,362	7,649	35,822

	Rate per 1,000 births.				
	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year.
1913	Not available.				43·0
1914	42·4	44·2	41·4	41·9	42·5
1915	45·9	45·2	42·5	41·7	44·0

The wild statements current a year ago are seen to be devoid of foundation. A small rise took place in the first quarter of 1915, but in the year the number was 1,500 less than in 1914. Owing to the smaller number of births, the illegitimacy rate shows a rise from 42·5 to 44·0 per 1,000 births. Illegitimacy probably increased where large numbers of soldiers were congregated, but, *ipso facto,* it would decrease in the districts from which these men had been drawn. As in the case of the Franco-Prussian War, the absence of some hundreds of thousands of young men with the colours involves a fall in illegitimacy.

56. *The Sex Ratio.*—Again, figures for our own country are the only ones available and the figures for each quarter in 1913, 1914, 1915 for England and Wales, London and Scotland are set out below :—

TABLE XXI.—*Number of male to* 1,000 *female births.*

Note.—" 10 " is omitted before each figure.

	England and Wales.			Scotland.			London.		
	1913.	1914.	1915.	1913.	1914.	1915.	1913.	1914.	1915.
1st quarter	41	31	32	58	35	74	46	24	21
2nd ,, ...	35	37	43	44	24	30	18	59	31
3rd ,, ...	40	31	44	26	32	46	40	32	28
4th ,, ...	35	43	44	37	47	42	44	69	28
Year	38	35	41	41	33	48	37	45	27

57. For none of the areas can one say that there was any significant increase. In London the ratio has fallen. The slight rise in England and Wales is well within the limits of the probable error of the sex ratio, as shown below. If the theory is true, one would expect that the longer the war lasted, the more would the desire for boys increase, and the more would the excess of male births increase. But there is no sign of this in these figures.

58. In order to test the fluctuations of the proportion of male births with the theory of errors, I took the total births, male and female, in England and Wales during the fifty-two years, 1864–1915. The proportion of male births thus found was 50·93 per cent. Applying the formula $\cdot 5093\, n \pm \sqrt{\cdot 5093 \times 4907\, n}$, where n is the total number of births, to any particular year, gives us the number of male births to be expected, and the standard error within which the number might fluctuate. For 1901 and 1902, the years mentioned in the *British Medical Journal*, and for the quarters and year of 1915, the expected number and its standard error is compared with the actual number, in the following table :—

TABLE XXII.—*Comparison of "expected" male births with actual number.*

Year.	Expected.	Actual.
1901	473,551 ± 454	473,944
1902	479,001 ± 457	479,144
1915 1st quarter	112,793 ± 222	112,465
2nd ,, ...	108,534 ± 218	108,773
3rd ,, ...	100,082 ± 209	100,381
4th ,, ...	93,428 ± 202	93,683
Year	414,839 ± 425	415,302

59. In no case, it will be seen, is the actual number outside the limits of random sampling. It is always well less than twice the standard error. I think we can conclude that there is no evidence of any effect of the war on the sex ratio. The causes of the excess of male births are many and various, but no scientific textbook on the determination of sex ascribes any influence to war, and the latest one by Dr. Doncaster does not even mention the theory.[8]

Summary.

60. I have now traced the effect of the war of 1870 on the vital statistics of the chief countries concerned, and dwelt briefly on the available statistics of the present war. The effects of war on the demography of the countries concerned are seen to be as potent in their "indirect" effects (*i.e.*, on the civil population) as in their "direct" effects. We had in the Franco-Prussian War a "destructive" period, when the death rate rises and the birth rate falls, followed by a "recuperative" period, when the death rate falls and the birth rate is augmented. The immediate effect was a lowering of the marriage rate, followed slightly later by a rising of the death rate, and later still by a lowering of the birth rate. The death rate is the first to shake off the effects of war, and the high marriage rate which follows the conclusion of peace in its turn affects the high birth rate which results after the war. The war of 1870–71 seems to have affected mortality the most, both among belligerents and neutrals. The present war seems to have affected fertility the most. The number of deaths among the civil population, during the Franco-Prussian War, was greater than the number of losses on the battlefield. This was also the case during the Austro-Prussian War. This excess of mortality is felt equally by the two sexes. The war had no more adverse effect among old persons than among those of other ages, and infant mortality was not very seriously augmented unless, as in France, acute distress and privation are present. Still-births were not affected and illegitimacy decreased.

61. The vital statistics of England and Wales seem to have been remarkably little affected by war. During the Crimean War and Indian Mutiny, the average number of marriages did not fluctuate by more than 0·5 per 1,000 as compared with previous and subsequent years, and during the South African War they only slightly varied. The wars of 1866 and 1870–1 had no effect on the English birth rate. Since 1876, the birth rate has almost continuously declined, and the Boer War did not interrupt this fall.

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[8] *The Determination of Sex.* Camb. Univ. Press, 1915.

62. It is too early to summarise the effects of the present war. Its chief effect has been to depress the birth rate in this country to the lowest on record, and in France and Germany a similar reduction is taking place. In January, 1916, the population of Berlin was declining by 300 a week on the average. I have seen no figures for Paris, but they are probably still more serious.

63. Nature does not compensate for our losses in men by sending more boys than girls. There is always, in all European countries, an excess of male births, which war does not affect.

64. The vital statistics of England and Wales for 1915 are certainly not very pleasant reading—it has been suggested that "mortal statistics" would better describe them—and it is to be feared that those of France will be more alarming when published. Our natural increase was only half last year what it was a few years ago. Even our increased marriage rate is of little use at present from the point of view of fertility. Let us hope that when the war is over, complete and adequate vital statistics will be available for all countries so as to enable a thorough study to be made of the present and ultimate effects of this war—one far more adequate and satisfactory than the present one, written at extreme pressure of other work.

In conclusion, I wish to thank Dr. Snow for advice and criticism in many ways.

APPENDIX.

Table showing number of deaths in the age group 5–14 *years,* 1863–77.

Year.	France.		Belgium.		Holland.		England and Wales.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1863	19,180	20,947	3,383	3,788	2,694	1,850	17,857	17,564
1864	18,193	20,451	3,824	4,252	2,889	1,938	17,593	17,107
1865	20.971	22,499	4,270	4.602	2,919	2.135	15,359	14,794
1866	21,279	22,320	6,083	6,143	4.131	2,531	15,117	14,200
1867	18,366	19,802	2,911	3,259	2,397	1,825	12,915	12,251
1868	20,036	21,726	3,008	3,296	2,360	1,920	15,019	14,423
1869	19,801	21,211	3,300	3,572	2,287	1,781	16,029	15,324
1870	23,325*	24,113*	3,592	3,970	2,734	1,982	17,373	16,517
1871	36,746	37,799	5,553	5,843	3,843	2,742	16,627	15,643
1872	19,192	21,047	4,171	4.310	3,248	2,124	14,799	13,905
1873	18.200	20,430	2,713	3,137	2,615	1,793	12,978	12,292
1874	17,099	17,349	2,627	2,852	2,205	1,625	15,531	15,090
1875	16,950	18,064	2,674	2,890	2,320	1,831	14,825	14,104
1876	16,945	18,053	2,563	2,943	2,227	1,876	13,960	13,343
1877	16,419	17,783	2,645	3,113	2,047	1,765	13,676	13,058

* Excluding Department of the Seine.

DISCUSSION ON THE PAPERS BY SIR JERVOISE A. BAINES AND MR. J. W. NIXON.

MR. BERNARD MALLET said he had much pleasure in rising to propose a vote of thanks to the authors of the two Papers on a subject which he supposed was perhaps the most important one the Society could consider at the present moment. That of Sir Athelstane Baines struck him as singularly able and interesting, and the figures, as usual with him, were very skilfully presented. He thought most of them would agree that his conclusions were sound. He asked whether it was quite correct to suggest, with regard to the death-rate, that the improvement had not been so marked among the very young as among adolescents and those in the prime of life. Excluding the abnormal year 1911, the rates for the last period dealt with by Sir Athelstane Baines showed a more substantial gain in recent years in the first five years of life than any other age period. That also seemed to be true of the period beginning with the present century. Taking the periods 1896 to 1900 and 1912 to 1914, the fall in the death-rate was as follows :—Age 0–5, 40 per cent. ; 5–10, 22 per cent. ; 10–15, 17 per cent. ; 15–20, 20 per cent. ; 20–25, 26 per cent. ; 25–35, 28 per cent. ; 35–45, 28 per cent. ; 45–55, 18 per cent. Then as regarded sex distribution, Sir Athelstane Baines had remarked on the lower average of girls born than boys born in comparison with other countries, and had quoted M. Bertillon's opinion that that was due to their defective system of registration. He had no wish to pose as an apologist for their registration laws, which no doubt in many directions cried out for reform, but in that respect he was sure that M. Bertillon's allegation was unfounded. There were other and more probable reasons for the differences. There were two general facts with regard to the year 1915 which might be noted. First, the actual proportion of male to female deaths showed an increase in the civil population, in spite of the number of men in the Forces. Also the proportion of female births showed an increase. Mr. Nixon's Paper covered so much ground that he felt it was very difficult to deal with it at all adequately. He must leave it to others to criticise his figures about France and Prussia in 1870 and afterwards. Perhaps they could say whether the registration in the countries affected by the war was sufficiently complete to enable them to draw any very definite conclusions. The figures of the military deaths struck one as rather curious. He did not know whether they were really accepted figures. He felt greater interest therefore in the section dealing with the present war, incomplete as it necessarily must be. The numbers of deaths given in Table XVI were for *all* deaths occurring in England and Wales, both civil and military. Mr. Nixon seemed to be in some doubt about this. Then there was the total figure in Table XVIII of deaths in Berlin in 1915. The figure of 28,527 must be far below the truth. During the fourth quarter alone they numbered 11,738, according to the Registrar-General's quarterly return and annual summary. With regard to the birth-rate in Germany, he could add a little to the information given by Mr. Nixon. For the eight months ending December 31, 1915, that was to say, for the first eight months in which the birth-rate would feel the full effect of the war, the birth-rate in German towns with a population of over 15,000 fell about 33 per cent., as compared with the corresponding period in 1913. The numbers were 418,000 in 1913, and 281,000 in 1915. Both speakers had dealt with the sex ratio in an interesting manner. There was one more quarter to be added to Mr. Nixon's Table XXI for England and Wales. The ratios for the last four completed quarters would therefore now stand at 1043, 1044, 1044 and 1050. It was impossible to say that those figures were conclusive, but they seemed to give some colour to the popular idea of more boys being born in war times than at other times, and to the conclusion arrived at by Von Fircks as to the effect of the wars of 1866 and 1871 on sex ratios in Prussia. A rather interesting figure had been given to him about the Prussian figures. 1871 might perhaps be taken as the year in which the direct effects of the war would be most felt. According to the Prussian Census of 1910, the male survivors of persons born in 1871 preponderated over female survivors. There were 204,576 males and 201,716 females. There must have been a very considerable preponderance in the birth of boys in 1871 to produce that result. There was a similar preponderance of surviving males, though less in amount, amongst persons born in 1873 and 1874. So far as they had traced them, all other years appeared to show a female preponderance, both before and after the war. It was a small point, but it seemed to him to be of some interest. He begged to move a hearty vote of thanks to Sir Athelstane Baines and Mr. Nixon.

Mr. E. A. H. JAY said he had great pleasure in seconding the vote of thanks for the two very important and interesting Papers they had heard read. Dealing with the question of the birth-rate, he had made enquiries in an important East End Borough, and had found one very remarkable thing, which was perhaps typical of industrial districts. In one district the birth-rate had fallen from 41·6 to 29·7 from 1905 to 1913, whereas in another quite adjacent district the birth-rate had only fallen from 32·9 to 32·8, which was very remarkable. He believed the reason was the different kind of population. In the latter case, where the fall in the birth-rate was so slight, they had practically the same people following the same occupation in the next generation, whereas in the district first mentioned there was a changing population. At the time when the birth-rate was so high, there had been a considerable influx of aliens. The difference in the rate of decline was remarkable. The rate was usually calculated on the expected trend of population during the years following the last decennial period, on the assumption that it would follow exactly the same course as it did in the previous ten years. That was not always quite the case. He believed that frequently there were considerable changes, owing to emigration and immigration. In one case he knew of, if that had been taken sufficiently into consideration, it would have raised both the birth-rate and the death-rate. He did not know how far that would affect the whole population of the country. He was very much interested in the question of infant mortality, because that seemed to be a sphere in which they could possibly do most to counteract the influences which were undoubtedly causing a gradual decline in the birth-rate. He did not know what steps it was possible to take to arrest that. It was largely a moral question. He took it that the raising of the standard of comfort, coupled with an absence of the sense of responsibility, was spreading down to the lowest strata of society, and having its effect there. At any rate he thought they could do something to counteract that effect by as far as possible lowering the rate of infant mortality. He believed it had been established that wherever they got a very high death-rate at the earliest stages, that was followed right up. Where they had a very high rate amongst children under one year, they found the same thing continued right up through childhood, and it was found to be due to housing and sanitary conditions, and ignorance and neglect on the part of parents, and their habits of life. That had its effect both before birth, immediately after birth, and for a considerable period afterwards. In one East End Borough in which he had made some enquiries, it appeared that 25 per cent. of the mortality amongst infants was due to such causes as atrophy, debility and diseases of the digestive organs, all of which were more or less attributable to ignorance and neglect on the part of parents, causes which one might hope were capable of being considerably affected by the remedies which were now being applied. In that respect they might hope for considerable results from the various agencies, such as Infant Care Associations, which have received grants from the Local Government Board for carrying on their operations, in the way of providing instruction for mothers, both before and after parturition. He hoped before very long they would begin to see definite results from the operations of such agencies. With regard to the death-rate at the most productive age, a large proportion was no doubt due to phthisis and tuberculosis amongst that section of the population. That had affected the death-rate amongst the population between 30 and 40; but tuberculosis dispensaries and other such agencies which were now actively at work, ought to have their effect in time. It seemed rather a remarkable statement to make with regard to the lower death-rate in Prussia, that owing to there being a smaller number of infants it had been possible to deal with them more effectually, and therefore the rate had decreased. If that were so in Germany, it ought to be universal. He did not know why it should apply more to Germany than to other countries, unless Germany had been more successful in taking steps to deal with it.

No more important subject could have been brought before them, and he expressed his thanks to the authors for their Papers.

Dr. T. H. C. Stevenson said he concurred in the expression of their obligation to the authors of the two extremely valuable and interesting Papers they had heard. They were of great interest to him personally, and were likely to afford him subject for consideration for some little time. With regard to Mr. Nixon's remark that he looked forward to the treatment of the effect of the present war upon the vital statistics of their community, he thought everybody concerned should clearly bear in mind that that effect could never be thoroughly studied unless this country obtained a Census directly after the war. The migration of population brought about through the war would have been so great that any Returns for districts, as the last speaker had pointed out, would be very greatly affected, and accuracy would be almost impossible to secure. As some of them had experienced, it was difficult enough to get over that difficulty in peace times, but under the circumstances of the moment, he almost despaired of any reliable figures for portions of the country, and in a lesser degree even for the whole of the country, after the war. Dealing with Sir Athelstane Baines' Paper, he said that Sir Athelstane quoted what would strike one at first as very alarming figures as to the preponderance of marriageable women over marriageable men; but as he thought he showed afterwards, that preponderance was in the main composed of elderly widows, and it might be of interest to mention the fact that at the ages at which the marriage condition of people was most interesting from the point of view of vital statistics, namely, 15 to 45, the preponderance was only 4¼ per cent. as against almost 20 per cent. for the whole period. Sir Athelstane remarked that: "It would be useful to know how far the decreased "fertility in question is due to the curtailment of the period of "childbearing by the later age at which women have been marrying "in recent years." He thought it was possible to express the extent to which it was due numerically, and he had made an attempt to do it. He thought the amount of fall due to that cause was about 5 per cent. Taking the birth-rate of the present day, and contrasting it with that of forty years ago, taking the years 1874 and 1914, the fall in the crude and standardized birth-rates was identical, namely, 34 per cent. They might therefore take it that the fall in crude birth-rate correctly expressed the decrease in fertility. But of the factors enumerated by Sir Athelstane Baines, the increase in the proportion of people of productive age would account for an increase in the birth-rate of 8 per cent., and the diminution in the proportion of married at that age would account for a decrease in the birth-rate of about 3 per cent. But as the crude birth-rate correctly represented the actual fall in fertility, they might take it that that favourable balance of 5 per cent. was wiped out by some other factor, namely, the diminution of fertility owing to women marrying later. He therefore thought they might put the numerical value of 5 per cent.

upon that (*i.e.*, 5 per cent. out of the total fall of 34 per cent., or about 15 per cent. of the recorded fall), thus redressing the balance and accounting for the fall of the crude rate being the same as the fall in the standardized rate. He expressed his agreement with all that was said as to the probable explanation of the decline of the birth-rate, and wished to mention one or two facts which seemed to him to support that conclusion. If standardized birth-rates, by which inequalities of opportunity, consisting as they did of the differing proportions in different populations of married women of the various fertile ages could be eliminated were worked out, they found in two neighbouring towns, Hull and Bradford, that the rates were almost identical in 1881. Thirty years later the rate for Hull had fallen from 31 to 26, and the rate for Bradford had fallen from 31 to 18. It seemed to him very difficult to conceive of any cyclical influence affecting the fertility in two towns in the same County in such different degrees in the same time. The same difficulties were met with if they compared the different countries making up the United Kingdom. They found that as between 1881 and 1911 the rate for England and Wales had fallen 30 per cent., that for Scotland had fallen 24 per cent. and that for Ireland had risen 5 per cent. If they confined their attention to the most Irish part of Ireland, namely, the Province of Connaught, they found the rate had risen 34 per cent. The figures were rather remarkable. In 1881, the standardized birth-rate for England and Wales was 34·65 and for Connaught 33·81, slightly lower; whereas in 1911 the rate for England and Wales was 24·67 and for Connaught 45·34, not very far off double. It might be suggested that difference in race came in, and that the cyclical influence applied to one race and not to the other ; but he believed that opinion was veering round to the belief that the difference in race was less fundamental than at one time it was assumed to be. In any case the experience of Wales and the Highlands of Scotland was very different from that of Ireland. He thought it was of interest in that connection to point out the trend of events in the German Empire. The standardized rate there did not fall at all after 1891 ; but in the twenty years which elapsed between 1891 and 1911 it fell by 26 per cent., and one wondered whether one of the considerations which might have been present in the mind of the authorities in Germany in deciding on war was that their position as regarded the proportion of men of military age in their population was likely to become more unfavourable as time went on, owing to the decline in their birth-rate. The decline was greater than in England. The decline in England for thirty years was 30 per cent., whereas in Germany the decline for twenty years was 26 per cent. It fell from 40·45 in 1891 to 29·87 in 1911. In calculating the standardized rates, the fact emerged very clearly, as Sir Athelstane Baines had pointed out, that the population of this country in 1901 was of maximum favourability for giving a low death-rate. Taking the population in 1901 as the standard, then the death-rates before and since had to be increased to allow for the gradual change towards and away from that optimum constitution. A population may either be too young or too old for the purpose of producing a low death-rate. If the proportion of young children was high, then the death-rate tended to be high, because of the large number of infant deaths included, as they saw in the case of the Russian population. If it were too old, as in the case of the French population, then the large number of old people with their relatively high mortality also turned the scale in the same direction; and it so happened that in 1901 the population of this country was such as to be most favourably situated for not only a low death-rate but a high birth-rate, and to yield the maximum number of men of military age. He was afraid that they had then begun to go down hill in all those three respects. It was rather curious that approximately the same constitution of population should apply for all three.

Dr. SALEEBY thanked Mr. Nixon for sending him an invitation to be present. He had with him a copy of the proof of the Report of the Malthusian League of the present year, which was a most outrageous document—scoffing, for instance, at the assertion that our rising age constitution, due to the continued fall in the birth-rate, must ultimately lead to a rise in the death-rate. He thought Mr. Nixon would be interested to know the special figures of Scottish infant mortality last year. It would be worth while putting in a footnote. A most excellent report on that subject had been prepared for the National Association for the Prevention of Infant Mortality by Mr. D. W. Kemp. Scottish infant mortality had jumped up very abruptly, and almost sensationally, last year. It was stated that the rise in infant mortality in England and Wales last year was principally due to measles. But the rise in the Scottish mortality, which was much more marked, was in no degree due to measles or any other epidemic. The weather was favourable, and there was no rise in infant diarrhœa or any epidemic; but it jumped up to 128 per 1,000, a higher figure than it had been since 1901, and a higher figure than 1855. The birth-rate in Edinburgh last year was less than 18—the lowest ever recorded in Scotland. A very interesting article by Dr. Norman Maclean, on the Scottish birth-rate, and notably Edinburgh, would interest Mr. Nixon. In Edinburgh last year it was one half of what it was in 1871. And though there were so very few infants born in Edinburgh, the death-rate among those infants abruptly rose, showing it did not merely depend upon the fall in the number of infants. The best comment on the idea that infant mortality simply followed the birth-rate, as the Malthusians asserted, was furnished by a comparison of the infant mortality in Paris and Edinburgh since the war began. In Edinburgh, with very few infants born, there was a greatly raised infant mortality, due without the slightest doubt to maternal drinking of spirits. In Paris the figures of the present war were much more interesting than Mr. Nixon had revealed in his Paper. According to a report by Professor Pinard, the greatest French authority on the care of infants, and Professor of Clinical Obstetrics in the University of Paris, great and unheard of measures were taken directly the war broke out to save the infants in Paris. As Mr. Nixon had recorded, they knew that practically no infants survived the Siege of Paris. They placarded Paris with notices calling for persons to come and help the infants, and had gathered a number of women together who had set to work to visit the mothers and take care of the infants. The death-rate among the infants fell to the lowest recorded figure. The infants were heavier at birth on the average than they had ever been, because they were carried longer by their mothers, and there were the fewest still births on record. The most remarkable results, which were obtained in the first six months of the war, had begun to fall off, according to Pinard, partly owing to a diminished enthusiasm on the part of the visitors, and partly owing to the extension of the occupation of women outside the homes, in the making of munitions, for instance. As he had taught for fourteen years, the immediate maternal environment of the infant was the vital thing; the war factors as such, and the movements of the birth-rate, were perfectly insignificant as compared with the maternal environment of the infant, which is *the* cardinal factor of infant survival or destruction.

Captain M. GREENWOOD joined with the other speakers in congratulating the authors of the Papers on their very interesting contributions. He thought Dr. Saleeby was mistaken in assuming that Neo-Malthusians were responsible for the view that the birth-rate and infant death-rate tended to vary together. It was a view which was held, and always had been, by all statisticians. The point was that no sound statistician argued that there was an essential and necessary causal relation between them. The vital statistics of every country showed the correlative variation. The most useful data on that particular subject were those of Bavaria, as published by Groth and Hahn, because in those data birth-rate, infant death-rates, proportions of bottle-fed infants and a measure of poverty were provided for each of several districts, so that four variables were available for study. Treating these by the method of multiple correlation, one found there was a residual connection between fertility, as measured by the corrected birth-rate, and the infant death-rate, a partial correlation. The suggestion made in some quarters that the whole, or practically the whole, of the infant death-rate was preventible, was in all probability fallacious; and the explanation which was the most plausible one, was that owing to the introduction of artificial methods of limiting the birth-rate, the latter was selective and unfavourably selective. In other words the fitter members of the community, in a physical sense, had a lower birth-rate and a lower infant death-rate, so that there was inevitably correlation between the fertility rate and the mortality rate. When artificial methods had thoroughly permeated the community, it would be interesting to see whether that high correlation between the mortality rate and the fertility rate still subsisted. If the theory he had suggested were correct, there would cease to be a high partial correlation between the two. If not, it would remain. To the illustrations which had been given by other speakers might be added that of the enormous fall in the corrected birth-rate of a well-to-do London borough such as Hampstead (30·01 in 1881, 17·55 in 1911), as contrasted with the almost stationary rate of working-class parishes such as Shoreditch (31·32 in 1881, 30·16 in 1911).

The CHAIRMAN (The Right Hon. LORD GEORGE HAMILTON) said he wished to express their sense of obligation under which the authors had placed them. Speaking as a very moderate statistician, one of the advantages he had often derived from the Papers was that they got rid of myths. A very pleasant myth he had on several occasions heard propagated in speeches with regard to careless mothers, was that he had heard people, including clergymen and others, impress upon their audiences the enormous influence of the maternal factor, and had given as an illustration that during the Siege of Paris, notwithstanding the fact that the women were half starved, the infant mortality was less than it was in normal times, in consequence of the greater care which the mothers gave. Unfortunately Mr. Nixon had annihilated that pretty theory by declaring that none of the babies born during that time lived. He thought one of the Papers had very clearly shown that the further theory that when there was a war there was immediately a large crop of male infants as compared with female infants, was also a myth. The nation was only following its usual custom of producing more males than females. They had had a great many statistics which were very interesting; and there were certain ages, both of men and women, where they were more prolific than others. He wondered whether any statistician had ever gone into the question of what the relative age of a man and a woman should be. He was told that in France there was a rule that the perfect proportion of age between a man and woman was that the woman should be half the years of the husband, plus seven. So that if a man married at twenty-five, the woman should be about twenty, and if the man was thirty, the woman should be twenty-two, and if the man married at forty, the woman should be twenty-seven. He had the theory, which was supported by statistics, that families were larger when there was a difference between the age of the man and the woman. Mr. Mallet had alluded to the rather defective system of registration which prevailed in this country as compared with other countries. He had noticed that the Englishman thought that it was one of his innate privileges not to be registered. It was an insult to the average Englishman to call upon him to register. He believed that one of the advantages of the Liability to National Service Bill, which would go through the House, and which he hoped would always be in operation, would most enormously improve the general system of registration because, when the law was passed that everybody who attained a certain age was liable to military duty, the actual numbers who came under the scope of the law, and the specific years when they came under it would be obtained, and in that way universal liability to service would have an important effect upon the whole system of registration.

Sir J. A. Baines, in reply, thanked those who had taken part in the discussion for their kindly references to the Paper, and for their criticism of certain points. To some of the latter he would reply as far as time allowed. In regard to the relative extent of the fall in child and adolescent mortality respectively, the former had, no doubt, improved of late more than that in later life, but he referred in his paper to the general course of the rates since 1871, during which time the decline in infantile mortality, at least, had been the later and more irregular. He would admit, however, that a closer study of the re-modelled tables of Dr. Stevenson than he had hitherto been able to give might alter his opinion on the whole case. As to the rising proportion of male births, Mr. Bernard Mallet was right, of course, as to the great rise in 1915, but the ratio seems to have been going up for some time, though very slightly. It was a difficult question to solve. Darwin had referred to an ardent desire for male offspring as an influence in the production of more male births, and this might be the case at the present crisis here. In India, where amongst important high castes, there was a positive aversion from female children, it was still uncertain how far the paucity of the latter was due to this cause or to some other and less abstruse. He had remarked in connection with this argument, long ago, that so strong a tendency, if valid, would ultimately lead to the extinction of the caste for want of mothers. Mr. Jay's remark about the uncertainty of the intercensal population of urban districts had been answered by Dr. Stevenson. In dealing, as in this paper, with the population of the country as a whole, the difficulty is less. But as far as the very interesting vital statistics for 1915 are concerned, no doubt the basis of population has to be ascertained by special means before use can be made of them statistically. The association of a high birth-rate with high infantile mortality, mentioned by Dr. Saleeby, is almost universal, and he could not enter into it on this occasion. He would refer, however, to the Local Government Board Reports upon the great improvement effected in Lancashire by well-devised systems of local instruction and supervision of the conditions preceding, as well as following, birth. In regard to the " fertility rate " he was not sure that he had used the term in the same sense as Dr. Stevenson had done. Possibly he misunderstood him. The ratio between legitimate births and the married women between fifteen and forty-five, however, had declined more in the forty-three years in question than the birth-rate. Dr. Saleeby had mentioned the publications of a "Malthusian," or "Neo-Malthusian," Society, and in connection with this nomenclature he always felt inclined to ask the classical question—" Why drag in Malthus ? " The important question raised by the President as to the influence of difference of age between married couples upon the progeny, was one which had received much attention from various writers from Sadler downwards, but was still unsolved. That the difference has some effect, there is no doubt, but its limits had not been satisfactorily determined.

Mr. J. W. Nixon, in reply, said that several of the points had been covered by Sir Athelstane Baines, and he did not need to deal with them. Referring to the question (raised by Mr. Mallet), the reliability of the figures, he could say that he thought the Prussian figures were fairly reliable. But as regarded the French figures, he was a little doubtful about this period, especially as no vital statistics for 1870 had been collected for the Department of the Seine. The figures of the military deaths in France were also very doubtful, and there were no possible means of getting accurate figures. The very elaborate volume by Dr. Engel, giving the number and regiment of every German soldier killed or wounded at various dates, showed that the figures could be fairly relied upon. He was not quite certain as to whether deaths of wounded soldiers occurring in this country were included in the English vital Statistics, and was glad to be confirmed on that point by Mr. Mallet. The Registrar-General for Scotland had separated them in his annual report for 1914; but the English report said nothing about them. He certainly did not agree with the theory that the smaller number of infants born led to greater protection and reduced mortality. The figures he had quoted from the German Press in this respect were not very reliable. He hoped that the quinquennial census which the Society had urged for a great many years, and which fell due next year, would be taken. He thanked them for the kind expressions contained in the vote of thanks.

The following Candidates were elected Fellows of the Society:—

Oswald T. Falk. Roy A. Snell.

ON THE MATHEMATICAL REPRESENTATION OF STATISTICAL DATA.

By PROFESSOR F. Y. EDGEWORTH, F.B.A.

ONCE more I take up the problem of which the object is to fit mathematical formulæ to certain kinds of data which are of common occurrence in statistics. I continue, and shall I hope conclude, the series of Papers dealing with this subject in the *Journal of the Royal Statistical Society* and elsewhere. A preliminary reference to some of those preceding Papers may make the purport of this continuation clearer.

My first contribution to the *Journal of the Royal Statistical Society*, the Paper published in its *Jubilee Volume*,* was connected with this subject in so far as it was devoted to the exposition of a law which plays a great part in the methods of representing statistics that I subsequently proposed. That law, in my view, either is the proper formula for representing the kind of statistics under consideration, or at least supplies the clue and key to the proper formula. The law to which is assigned this prominence, the so-called law of error, is commonly known as the Gaussian law. But I agree with Professor Karl Pearson in thinking that Laplace is better entitled to give a name to this important law. I at least am more indebted to Laplace. Following Laplace I have in the initial Paper referred to described the law of error as generated by taking averages. There is thus obtained a criterion of the worth of an average, of the extent to which it is likely to differ from another average *in pari materia*, or from the ultimate mean which would be obtained by averaging an indefinitely large number of constituents under conditions supposed to be unchanged. Dr. Bowley has illustrated this criterion in his address to Section F of the British Association, and has employed it in important investigations involving the use of *samples*.

From Laplace's conception of the law of error as generated by taking again and again an average of numerous independent observations it is a short step, but one apparently not taken by Laplace, to the conception of the law as generated by the composition of numerous independent causes such as presumably occurs in those parts of Nature, including human conduct, which are amenable to statistical science. Upon this hypothesis are to be explained the fulfilments of the law observed by Quetelet in numerous classes of phenomena—such as the various heights of adult males in a homogeneous population. Later statisticians have extended the territory over which the law prevails. In particular Professor Karl Pearson has made important additions to this realm. But he also has insisted upon the incapacity of the law of error to represent many and important forms of grouping which continually occur in concrete experience. To represent such groups Professor Pearson has proposed his well-known system of frequency curves.*

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* *Journal of the Royal Statistical Society* will be hereinafter briefly referred to as *J.R.S.S.*

I at first supposed that the gap between experience and the pure theory of probabilities from which the law of error is deduced might be bridged over by using a form of the law due to Poisson, more general than that which Quetelet employed. The relation of this more general form to the one which is primarily understood by the term "law of error," and is technically described as the "normal" law, may be thus stated. Whereas the normal law is to be regarded as the ultimate form which tends to result from the composition of an indefinite number of independent elements, the generalization effected by Poisson represents a *penultimate* stage of this process, a stage at which the complete pulverization of contributory causes has not been reached. In other words, the normal law of error may be regarded as the *first* approximation to the actual shape, the correction of which forms the *second* approximation. This construction is adequate to represent a number of moderately asymmetrical frequency groups, as Dr. Bowley has shown in his *Elements of Statistics*.† I have extended the sphere of correspondence between theory and fact by ascending to the *ante-penultimate* stage, forming the *third* approximation to a given frequency distribution. But neither this extension, nor the further approximations which I have given under the designation of the "Generalized law of error,"‡ have proved adequate to represent all the frequency groups which, it seems to be generally thought, require representation. It should be added that the "normal" and even the "generalized" law of error are in general appropriate to represent only a portion, a large portion, indeed, it may be about 90 per cent., of any total group.

The peculiar use and beauty which characterize the formulæ which are based upon a *vera causa*, upon the fundamental assumptions of theoretical statistics, are thus confined within strict limits. Outside those limits we must be content with *empirical* formulæ.

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* It is superfluous to refer to Professor Pearson's exposition of his methods in the *Transactions of the Royal Society* for 1895 (A) and subsequent volumes.

† *See* the Appendix to the Second Edition.

‡ *J.R.S.S.* (1906).

Of this character is the plan which I proposed in the *Journal of the Royal Statistical Society* in 1898 and the following years, under the title of the "Method of Translation." At first, indeed, this method was not clearly differentiated from the generalized law of error. But the tentatives made in the earlier treatment of the subject were developed in a Paper communicated to the Congress of Mathematicians in 1912. The suggestions briefly announced in that Paper were subsequently expanded and exemplified in a series of Papers published in the *Journal of the Royal Statistical Society* for the year 1913-14.

I now resume the consideration of the two methods of representing statistics which are described respectively as the "generalized law of error" and the "method of translation." To confirm, complete and connect these two methods is the design of the following pages. First, I adduce some additional examples of procedures already proposed with respect to either method. Secondly, I suggest some new processes for connecting the data with the coefficients entering into the formulæ proper to each of the two methods. Thirdly, I shall consider the relation between the two methods. These additions will first be made with respect to the simple case of observations varying in only one dimension. Frequency-*surfaces* will be separately treated. In fine, I hope to compare the methods of representation which I propose with other methods which are more in vogue.

SECTION I.—CONFIRMATION OF CONSTRUCTIONS ALREADY PROPOSED.

The generalized law of error, using moments.—My first object is to verify operations proposed in preceding Papers by additional examples. My first example illustrates my first method, the generalized law of error. The example is taken from a collection which I have found very useful, the set of examples given by Dr. Isserlis in his Paper on "The Application of Solid Hypergeometrical Series to Frequency Distributions in Space," in the *Philosophical Magazine* for September, 1914. Not only are the data there presented well suited to test and illustrate methods of representing frequency-distributions; there is also the further advantage—a very considerable benefit to one who is sensible of his weakness as an arithmetician—that part of the calculations required for our purpose, namely, the determination of the relevant *moments*, has already been performed by Dr. Isserlis. He has not only opened up a quarry containing just the sort of stone which we require for our constructions, but he has hewn and dressed the blocks ready to hand for our use. My first example forms part of his third; which consists of a set of observations described as "unpublished material of Professor Karl Pearson"—one of the many elaborate experiments in probable matter for which the student of Probabilities has to thank Professor Pearson. The number of trumps held by the first hand in a deal at whist, and also the number held by the second hand, having been observed for *twenty-five thousand* deals; there is recorded the frequency with which different numbers of trumps were held by each hand. We are not at present concerned with the *correlation* between the numbers in the two hands. It suffices to reproduce the frequencies pertaining to one of the hands. In Table I, the second row shows the number of times—in the course of 25,000 deals—that each particular number of trumps was held by the first hand. The third row shows the relative frequency of each event, the number of times that it occurred divided by the total number of deals, viz., 25,000.

TABLE I.—*Showing the number of trumps held by the first hand in* 25,000 *deals at Whist.*

No. of trumps.	0	1	2	3	4	5	6	7	8
Absolute frequency	215	1,724	5,262	7,440	6,371	2,950	852	166	20
Relative frequency	·0086	·06896	·21048	·29776	·25484	·1180	·03408	·00664	·0008

For the mean of these observations (the centre of gravity, or centroid) Dr. Isserlis gives 3·24944. For the mean square of deviations from the mean he gives 1·66130; whence we—who adhere to the terminology of the older writers, without condemning newer fashions*—deduce for the *modulus* ($\equiv \sqrt{2}$ *Standard Deviation*) 1·8228, or less exactly 1·823. The other constants which we require are obtained from some of the many *moments* which Dr. Isserlis has calculated. For β_1, in the notation of Professor Pearson, he finds ·03333; and for β_2, in the same well-known notation, 2·9347. Now β_1 being the square of the mean third power of deviations from the mean divided by the cube of the mean second power of deviations, in a commonly adopted notation μ_3^2/μ_2^3, is identical with *eight times* the square of the coefficient which with reference to the generalized law of error we have called k_1 and sometime j_1, the symbol adopted by Dr. Bowley. Using the latter symbol on this occasion we have $j = \sqrt{\frac{\cdot 0333}{8}} = \cdot 065$ nearly. Also k_2, for which we shall use the older symbol, $i, = \frac{1}{4}(\beta_2 - 3) = {}^{-}\cdot 0163$ nearly.

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* As to the choice of parameters see my article on Probability in the eleventh edition of the *Encyclopædia Britannica*, note to p. 391, col. A. In the preference which I give to the *modulus* in the present Paper I am influenced by the convenience of using tables even more helpful than those of Dr. Sheppard; the tables given by Dr. Burgess (in the *Transactions of the Royal Society of Edinburgh*, vol. published in 1900) for values of the probability integral at intervals of ·001 *modulus*.

We can now without further trouble write down the equation to the curve which represents the given distribution :

$$y = \frac{1}{\sqrt{\pi}\,1\cdot 8228}\, e^{-x^2\,3.3226}\left[1 \mp \cdot 065\left(\frac{2}{3}\frac{x}{c} - \frac{4}{3}\frac{x^3}{c^3}\right) - \cdot 0163\left(\frac{1}{2} - 2\frac{x^2}{c^2} + \frac{2}{3}\frac{x^4}{c^4}\right)\right]$$

where x is the distance of any point on the abscissa measured from the centroid $3\cdot 2494$ as origin, $c = 1\cdot 8228$, and the negative or positive sign is to be prefixed to the second term within the square bracket according as x is positive or negative.

To test the accuracy of this representation let us compare each of the given (relative) frequencies with the corresponding figure as determined by calculation—over the range for which the construction is presumed to be valid, that is, up to a distance of about one modulus from the origin of the constructed curve. For the purpose of the comparison we shall assume that any of the given figures showing the number of times that a certain number of trumps occurred, *e.g.*, five trumps 2,950 times, may be treated as if those observations were spread out between the points $x = 4\cdot 5$ and $x = 5\cdot 5$. In other words we shall compare with the number of observations given as occurring at the point x_r with the area of the representative curve contained between the points corresponding to $x_r - \frac{1}{2}$ and $x_r + \frac{1}{2}$.* To calculate these areas we remark that each of them is made up of three elements. There is first the main term which forms the first approximation, the area of the normal curve with unit modulus contained between the points on the abscissa of that curve which correspond respectively to $x_{r-\frac{1}{2}}$ and $x_{r+\frac{1}{2}}$. Now the point on the representative corresponding to any point x in the original figure is x divided by c (the modulus) say ξ. Besides this main constituent of the area under consideration there are two additions or corrections which may be written $-\,j\frac{1}{3\,!}\frac{d^3\eta}{d\xi^3}$ and $+\,i\frac{1}{4\,!}\frac{d^4\eta}{d\xi^4}$; where η is the ordinate of the normal probability curve corresponding to the abscissa ξ; ξ is taken with its sign—otherwise, if ξ is taken in absolute quantity, it is proper to use the negative sign in the first term for points above, and the positive sign for points below the origin. Now the indefinite integral of the first term is $-\mathrm{j}\,\frac{1}{3\,!}\,\frac{d^2\eta}{d\xi}$; from which we can at once write down the definite integral contained between any two values of ξ. Thus the integral between any assigned value of ξ and zero is $\mp\ \mathrm{j}\,\frac{1}{3}\,(\eta_0 - \eta + 2\,\xi^2\eta)$ where the negative sign is to be taken for values of ξ above the origin, the positive sign for values of ξ below the origin; η_0 is the ordinate at the origin (of the normal curve with unit modulus), viz., $1\,/\sqrt{\pi}$. We shall call this expression $\mp\ \mathrm{j}\,\Phi\,(\xi)$. Likewise the integral of the second term between any value of ξ and zero is $\mathrm{i}\,\frac{1}{4\,!}\,\frac{d^3\eta}{d\xi^3} = \mathrm{i}\left(\frac{1}{2}\xi - \frac{1}{3}\xi^3\right)\eta$, say $\mathrm{i}\,\Psi\,(\xi)$. From the successive values of Φ and Ψ we can at once deduce the required portions of area say ϕ and ψ, contained between any two assigned values of ξ. The calculation is exhibited in Table II.

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* The special treatment of discrete quantities will be considered in the following section.

In this table X denotes the number of trumps considered as a continuous variable, x is the distance of X from the mean 3·2494; $\xi = x/c$ ($c = 1{\cdot}823$). $\Theta = \int_0^{\xi} \frac{1}{\sqrt{\pi}}\,e^{-\xi^2}\,dt.$ θ is the difference between the value of Θ for an assigned abscissa, *e.g.*, 1·2346 and the value thereof for the adjacent entry on the side of the origin, *e.g.*, ·6860; except in the case of the central compartment, that which extending from $\xi = -{\cdot}4111$ to $\xi = {\cdot}1375$ covers the origin. In this case θ is the *sum* of the two adjacent Θs. $\eta = \frac{1}{\sqrt{\pi}}\,e^{-\xi^2}$ (given in Burgess' tables*). Φ and Ψ are defined as above; ϕ being related to Φ and ψ to Ψ, just as θ is related to Θ. j and i have the values above obtained for them, viz., ·065 and −·0163 respectively. $\mathrm{j}\phi$ takes the negative sign for compartments above (right of) the central one, the positive sign for compartments below the central one. For the central compartment $\mathrm{j}\phi$ is the sum of two products, of which the one pertaining to the abscissa above the centre takes the negative sign, the other the positive sign. But i has the same sign—in this instance negative—throughout. The correction of the first approximation, viz., $\mp\ \phi + \psi$ is shown separately. The addition of this correction to θ gives v the calculated area of a compartment. The outlying values of v for the compartment bounded on the left by 5·5 (ξ 1·2346) may be found by subtracting $\Theta - \mathrm{j}\ \Phi + \mathrm{i}\ \psi$ from ·5; and similarly the v at the lower extremity ($\mathrm{j}\ \Phi$ here taking the *positive* sign).

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* Referred to above.

Subjoined is the corresponding observed frequency, here called U obtained from Table I; e is the difference between u and U. The sum of the quantities e^2/U may be used as a criterion for comparing the accuracy of the representation with that of other constructions applied to the same number of observations *in pari materia.*

TABLE II.—Showing the use of moments for the generalized law of error.

X	1·5		2·5		3·5		4·5		5·5
x	−1·7494		−·7494		+·2506		+1·2506		+2·2506
ξ	−·9596		−·4111		+·1375		+·6860		+1·2346
Θ	·4126		·2194		·07715		·3341		·4596
θ		*·1932*		*·29655*		*·2569*		*·1255*	
η	·2247		·4765		·5539		·3523		·1227
ξ^2	·92064		·16884		·01891		·4706		1·524
Φ	·25107		·0828		·0105		·1812		·2719
ϕ		*·1683*				*·1707*		*·0907*	
$\pm j\phi$		*+·0109*		*−·0015*		*−·0111*		*−·0059*	
ξ^3	−·88363		−·06948		·0026		·3228		1·8818
$i\Psi$	−·0007		−·00142		−·0006		−·00135		+·0002
$i\psi$		*+·0007*		*−·002*		*−·0007*		*+·0015*	
$\pm j\phi + i\psi$		*+·0116*		*−·0035*		*−·0118*		*−·0044*	
υ		*·2048*		*·2935*		*·2451*		*·1211*	
U		*·2105*		*·2976*		*·2548*		*·1180*	
e		*−·0057*		*−·004*		*−·01*		*+·003*	
c^2/U		*·00015*		*·00004*		*·0004*		*·00008*	

X denotes numbers of trumps (in the first hand at whist).

$x = X - 3{\cdot}2494.$

$\xi = x \div 1{\cdot}8228.$

$\Phi = \frac{1}{3}\,({\cdot}56419 - \eta + 2\xi^2\eta).$

ϕ is the difference (in absolute quantity) between the values of ϕ at the two boundaries of any compartment, except for the central compartment; as to which see text.

j = ·065. jϕ is positive for compartments below the central one, and negative for compartments above the central. As to the central one see the text.

$i = -\ {\cdot}0163.\quad i\Psi = -\ {\cdot}0163\left(\frac{1}{2}\xi - \frac{1}{3}\xi^3\right)\eta;$ ξ (and ξ^3) being taken in absolute quantity.

iψ is formed by taking differences between successive values of iΨ.

$\upsilon = \theta \pm j\phi + i\psi.$

U is the given content of each compartment.

$e = \upsilon - U.$

It is to be observed that the criterion here proposed for a particular purpose is not identical with Professor Pearson's celebrated criterion for testing goodness of fit. His χ^2 being equal to, in our notation, $\frac{S\,(N^2\,e^2)}{S\,(N\,U)}$, where N is the total number of observations, is N times as great as our criterion $S\,\frac{e^2}{U}$. His criterion applied to our representative curve, showing for χ^2 the large figure 40 (while

$n' = 6$) would prove our construction to be a complete misfit. And so, of course, it would have to be judged if it claimed to be an exact representation of a grouping of which the genesis is known, and is known to result in a law of distribution quite distinct from the generalized law of error. It is not to be expected, I think, that *any* general system of representation applied to *any very large* group of observations, not known to be generated on the hypothesis underlying the system, not specially exemplifying that system, should stand the Pearsonian criterion. For instance, I should be surprised if the Pearsonian Types would stand the Pearsonian criterion in the case of Dr. Isserlis' *second* example, which consists of the distribution of 235,252 ages at marriage.* The generalized law will not in general represent perfectly even the forms which are akin to it in that they are generated from *independent* causes or elements. Much less will it represent perfectly forms of which the constituents are *interdependent.* But the generalized law can represent even the latter forms approximately and for some purposes adequately. It is true that independence of elements is conspicuous among the provisional assumptions which serve as a key to the proof of the law. But many of these assumptions are subsequently relaxed ; as observed by Mr. Palin Elderton in his review of my principal essay on the subject.† And one of the relaxed assumptions is that of perfectly independent elements. A note which Professor Pearson has added to Mr. Palin Elderton's review may lead to some misconception of this matter. Professor Pearson writes : "The assumptions that the elementary "cause-groups are independent, and that the aggregate is obtained "by summation, have yet to be justified. In particular the first "assumption is opposed to the basis of every determinantal theory "of heredity, and accordingly the frequency distributions of "characters, which result from the fusion and throwing out of "chromasomes, *i.e.*, characters in living organisms, are extremely "unlikely to comply closely with Professor Edgeworth's form of "frequency. I have repeatedly urged the necessity for considering "contributions to the aggregate as *correlated*, *i.e.*, the hypergeometrical "as distinguished from the binomial form of series as the basis of "frequency distributions." ‡ Upon this I remark that distributions resulting from correlated constituents *are* capable of being represented by the generalized law of error with fair approximation—provided that the number of the constituents is sufficiently great in relation to the degree of their independence. Even the distribution to which the hypergeometrical law is specially adapted, that which results by extracting balls or cards from a *melange* without replacement, even this peculiarly Pearsonian type is capable of being represented by the generalized law; as I have proved theoretically in a former number of this *Journal** and shown empirically here. Professor Pearson must be understood to mean in the passage cited that his "hypergeometrical" as compared with my "generalized" law is applicable over a wider range of cases and to a greater portion of each case. This I do not deny, and if I have ever used expressions which might be interpreted otherwise, I retract them.†

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* The Statistics cited below, p. 469.

† Review in *Biometrika*, Vol. V., of F. Y. Edgeworth's Paper on the Law of Error in the *Cambridge Philosophical Transactions*, 1905.

‡ *Loc. cit.*, p. 206.

I trust that an equally amicable agreement may be reached with respect to another criticism which occurs in the review to which I have referred. I allude to the complaint which Mr. Palin Elderton bases on the fact that the generalized law of error in one of the examples given by me in this *Journal* extends at one extremity considerably beyond the possible limit of the group which it purports to represent. The frequency curve purporting to represent the number of children in a family "gives 40 cases out of 1,000 as having "less than no members."‡ The difficulty here felt is no doubt the same as that which Mr. Palin Elderton has expressed in the important Paper which he contributed to the fourth International Congress of Mathematicians "On a comparison of some curves used for graduating chance distributions." There, in a context rather too long to be cited here in full, Mr. Palin Elderton observes that "the "reproduction [by the constructed curve] of the exact number of "observations is not only of practical necessity, but is assumed by "the method of moments which Edgeworth himself uses." § It is hard to see, he says, how one is justified in "basing much argument "on constants derived from the higher moments which have large, "almost overwhelming probable errors." Now if it is merely meant that a curve cannot be constructed by way of moments to represent fairly a considerable portion of an actual group without the use of moments obtained from the entire groups, without utilizing powers of observations at the extremities, this I fully admit.* Nor am I concerned to deny that mean powers above the fourth are liable to preventive probable errors. But how does all this go to prove what the author seems to imply, that there is some peculiar vice in our construction, because if continued beyond the limits within which it purports to be accurate it is inaccurate ? His disparaging suggestions bear equally on the most solid and ancient structures in probabilities. Such is Laplace's earliest use of the law of error to represent a binomial.† Suppose a perfect die to be tossed at random eighteen times, and this experiment to be repeated again and again, then by a well-known theorem the number of aces in a batch of eighteen will range approximately according to a normal law of error of which the centre is 3 and the modulus is $\sqrt{5}$, the standard deviation $\sqrt{2\cdot5}$. We may suppose this standard deviation to be ascertained not *a priori* from the given ratio 1 : 6, but by inference from the mean square of deviation observed for a great number of batches. We are not prevented from employing the normal law of error to determine approximately the respective number of times that in a batch of eighteen dies there will occur two or three or four aces, because if continued beyond the limits within which it purports to be an approximation, the formula would give out of a thousand batches some fourteen cases of batches having *less than no* aces, and accordingly there is not a "reproduction of the exact number "of observations."‡ Similar objections might be made to the use of the *second* and the *third* approximations to the binomial. No doubt, in order to express significantly the outlying portions of the binomial there would be required—for the higher terms of the generalized law of error—constants which if determined by moments would involve moments liable to overwhelming probable errors. But that circumstance does not preclude our applying the approximations formulated by Laplace and Poisson over a considerable tract of the given set of observations.

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* *J.R.S.S.* (1906).

† The limits within which the generalized law holds good are treated in the Appendix to my Paper of 1906 (J.R.S.S.) with some inaccuracies, which will be corrected in the third section of the present Paper. One of them is relevant here: the obvious misprint on the last page in the last but one paragraph, where for "·1" there should be read "1," as the proportion of the modulus up to which accuracy is claimed in the case of the example to which Mr. Palin Elderton's remarks refer.

‡ *Loc. cit.*, p. 208; referring to J.R.S.S., 1906.

§ Reprint of the Fourth Congress, Vol. III, p. 242. There is a copy of Mr. Palin Elderton's Contribution to the Congress in the library of the Royal Statistical Society.

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* I at first supposed that this was the gist of Mr. Palin Elderton's criticism (*cp. J.R.S.S.*, LXXVII, p. 505) but I now see that it has another, or at least a wider, signification. By "reproduction" of observations he means more than what I supposed him to mean, merely "utilization."

† *See* Todhunter, *History of Probabilities*, Art. 993.

‡ The distribution of aces in the long run which forms the data to be represented may be figured as a "histogram" consisting of columns, each standing on a base of unit length, of which the middle point represents an integer number, 0, 1, 2, 3 . . ., the height of the column representing the frequency with which that number of dies in a batch occurs. Thus the column furthest to the left is of height $(\frac{1}{6})^{18}$, and its base extends to the point $-\cdot5$, a point distant 3·5 from 3, the centroid. Now $3\cdot5/\sqrt{2\cdot5} = 2\cdot214$ nearly, a multiple of the *standard deviation* beyond which occur some *fourteen* per mille of a normal group. The existence of such a fictitious tail in the representative form proves only that corresponding to this excess at the extremity there must be defect *somewhere* in the body of the curve. But *it does not follow that the central portion of the group which alone we claim to represent accurately is inaccurate in the degree suggested.*

None of the objections which have been directed against the generalized law of error appear to apply to its use within the modest limits exemplified in the instance above given. Within its narrow territory it prevails by a title more just than its rivals can prefer to the more extensive region which they occupy. For it alone is the expression of a *vera causa* ; related to merely empirical formulæ much as an expression appropriate to a physical law, such as the law of the inverse square, say the expression $y = A/x^2$, is related to a formula adopted for the sake of convenience as adaptable to a great variety of observations, such as the parabola of higher orders, say $y = a + bx + cx^2 + dx^3 + \ldots$ This general function happens, indeed, not to be convenient for the representation of frequency groups. For that purpose the formulæ proposed by Brunn, or Charlier, or Pearson, or even our own method of translation, may be more serviceable than a rational algebraic function ; and one of them may be more serviceable than another. But they all of them, as merely empirical expressions, fall short of the beauty and scientific interest which attaches to the pure theory of Probabilities.

The method of translation, using moments.—Descending from the heights of theory, I proceed, on the lower plane of empirical evidence and practical convenience, to exemplify the secondary method which I have designated by the term "translation." First, let us consider the variety of the method which was first described[*] in the exposition which I am now supplementing, the construction based on *moments.* For this purpose the statistics above borrowed from Dr. Isserlis, will serve again. He supplies the constants required by our method, viz., $\beta = \frac{1}{8}\beta_1 = \frac{1}{8}\cdot 03333 = \cdot 004166$ $\epsilon = \frac{1}{12}(\beta_2 - 3) = \frac{1}{12}(2\cdot 9347 - 3) = -\cdot 00544$. Whence we obtain two simultaneous equations of high dimensions for χ and λ, the coefficients of translation. But the constants β and ϵ being small, probably a first approximation is sufficient for our purpose. The first approximation to χ is $\frac{4}{9}\beta$, say $\cdot 0019$.[†] The first approximation to λ is $\epsilon - \frac{8}{9}\beta$, say $-\cdot 01$. From these first approximations we may proceed by methods indicated in a former Paper to a second approximation.* Presumably it would be better not to use the summary formula for the second approximation, there given as appropriate to cases in which λ and χ may be regarded as of the same small order. It might be best to substitute in the leading equations for λ, $\cdot01 + \delta\lambda$; and then, neglecting higher powers of χ and $\delta\lambda$, to determine those two small quantities by simultaneous simple equations. But I have not thought it worth while to perform these operations; as it appears that the equations are nearly satisfied by the first approximations. I think it probable that by using more accurate values of χ and λ a somewhat better verification might be obtained. I may add in this connexion that the exemplifications presented in these pages would probably show to greater advantage had they been performed by a more careful arithmetician; judging by the experience that wherever I have detected a mistake or used a closer approximation the result has been improved by the correction. I have detected many mistakes; but I fear that there remain many undetected.

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[*] *J.R.S.S.*, LXXVII (1914), p. 306 *et seq.*

[†] *Loc. cit.*, p. 310.

From $\chi = \cdot0019$ we have $\kappa = \pm\sqrt{\chi} = \pm\cdot0436$; the positive or negative sign being given to κ according as the mean third power of deviations is positive or negative. In our example it is positive. We have thus for the value of x, the distance of any point on the given histogram from the median, the operator $a\,(\xi + \cdot0436\xi^2 - \cdot01\ \ )$; where ξ is the abscissa of the point on the normal curve with unit modulus corresponding to x on the given histogram, ξ like x being taken with its sign; a, essentially positive,

$$= \sqrt{2\mu_2/\left(1+\chi+3\lambda+\frac{15}{4}\lambda^2\right)} = \sqrt{3\cdot3226/\cdot972275} = 1\cdot8485.$$

The Median, it will be remembered, from which both x and ξ are measured, is a point defined by the moments, being distant $-\frac{1}{2}\kappa$ from the centroid; that is, in the case before us a point distant $\cdot0218$ from the Mean, $3\cdot2494$, on the left, that is the point $3\cdot228$. The "constructive median" we might call the median so determined from the moments.

To test the validity of this construction let us compare the observed area of any compartment bounded by two successive values of x with the corresponding area determined by calculation. Now to determine the ξ corresponding to any assigned x we have the cubic equation $-\cdot01\xi^3 + \cdot0436\xi^2 + \xi = \cdot54095\,x$ $(\cdot54095 = 1/a)$; where x and ξ receive negative values when they relate to points below (left of) the median. Assigning to X the various values obtained from the given statistics interpreted* as before, I place the corresponding value of x in the second row of Table III. In the third row is the

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* *Loc. cit.*, p. 311.

TABLE III.—*Showing the use of moments for the Method of Translation.*

X	·5	1·5	2·5	3·5	4·5	5·5	6·5
x	−2·728	−1·728	−·728	+·272	+1·272	+2·272	3·272
x/a	−1·4755	−·93475	−·3938	+·1471	+·6881	+1·229	+1·77
ξ	−1·636	−·987	−·4015	+·146	+·6725	+1·1845	+1·694
Θ	·4897	·4186	·2149	·0819	·3292	·4531	·4917

θ	·0103	·0711	·2037	·2968	·2473	·1239	·0386	·0083
U	·0086	·0689	·21048	·2976	·25484	·118	·03408	·00744
e	+·0017	+·0022	−·0068	−·001	−·008	+·006	+·004	+·001
ϵ^2/U	·00034	·00007	·00022	0	·00025	·0003	·0005	·00013

constant term of each cubic equation of the type above given. For instance, corresponding to the point $X = 1\cdot5$ we have $x = 1\cdot5 - 3\cdot228 = -1\cdot728$. Which multiplied by $\cdot54095$ gives the constant term of the cubic

$$\xi + \cdot0436\,\xi^2 - \cdot01\,\xi^3 = -\cdot93475\,;$$

which is conveniently solved by putting $|\xi|$ for the absolute quantity of the negative root of the equation; writing the equation

$$-\cdot01\,|\xi|^3 - \cdot0436\,|\xi|^2 + |\xi| = \cdot93475\,;$$

and solving by Horner's method (which does not require that the coefficient of the highest term should be positive unity). Whence $|\xi| = \cdot987$; $\xi = -\cdot987$. From the value of ξ thus ascertained I obtain the value of the probability-integral from zero up to ξ, the area termed $\frac{1}{2}\,\alpha$ by Dr. Sheppard, $\frac{1}{2}$ H in the notation of Dr. Burgess, whose tables I here again† employ. From Θ we obtain θ, the area of a compartment, by a simple subtraction as explained with reference to Table II; except for the central compartment, for which it is proper to *add* the two adjacent values of Θ as thus: $\cdot2149 + \cdot0819 = \cdot2968$, the calculated content of frequency between the number (of trumps) $2\cdot5$ and $3\cdot5$. The calculated values of θ are then compared with the observed values of U. The correspondence between fact and theory is very satisfactory.

If we compare the method of translation with the generalized law of error with respect to the central compartments, which alone afford a strict comparison, there would seem to be little difference in the success obtained. The sum of the entries for e^2/U for the four compartments which are common to both tables, lying between $\mathrm{X} = 1 \cdot 5$ and $\mathrm{X} = 5 \cdot 5$, is here $\cdot 0008$, whereas there it was $\cdot 0007$.

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* Above, p. 459.

† Referred to above, p. 458 note.

I now proceed to apply the method of translation to a case which does not lend itself so well to treatment by way of moments. This case is presented by a part of Dr. Isserlis' *second* example: namely, the distribution of the ages at marriage of spinsters. Taking the age of *fifteen* for the origin of X and as its unit a period of five years we have—still taking the liberty of using Dr. Isserlis' computations—for the mean age at marriage 2·0228 (*lustra* measured from fifteen years of age, that is, in ordinary parlance, 25·1139 years of age). As to the constants entering into the equations for χ we have $\beta = \frac{1}{8}\beta_1 = \frac{1}{8} 2 \cdot 730913 = \cdot 3414$ nearly; $\epsilon = \frac{1}{12}(\beta_2 - 3) = \frac{1}{12}(8 \cdot 77876 - 3) = \cdot 48156$ nearly. The equations thence formed cannot be treated approximately as simple equations. We must resort to methods of investigation such as I have suggested in a former paper.* Using the materials which I collected for the construction of a rough table for the roots of the equations corresponding to assigned constants, I find that the values $\chi = \cdot 15$ $\lambda = \cdot 15$ pretty well satisfy the equations. In fact, substituting in the equations for χ, $\cdot 15 + \delta\chi$ and for λ, $\cdot 15 + \delta\lambda$. I obtain two easily workable simultaneous simple equations for $\delta\chi$ and $\delta\lambda$, higher powers of these variables being neglected.

Are not all simple equations easily workable ? it may here be asked. I reply that they may all be easy, but they are not all safe as used for the present purpose. When—in the case of two variables, for instance, and *mutatis mutandis* a greater number—the *determinant* pertaining to the system is very small, or, in other words, the lines represented by the two simple equations nearly coincide, then it is commonly no longer safe to neglect the higher powers of corrections such as our $\delta\chi$ and $\delta\lambda$. However, in the case before us this hitch does not occur ; and I find for second approximations $\lambda = \cdot 16$ and $\chi = \cdot 14$. Using these values and the value of μ_2 given by Dr. Isserlis, viz., $\cdot 8294195$ I find for $\frac{1}{a}\left(= \sqrt{\frac{1 + \chi + 3\lambda + \frac{15}{4}\lambda^2}{2\mu_2}}\right) 1 \cdot 01708$. Also $\kappa = + \sqrt{\chi}$ (the mean third power of deviation, as given by Dr. Isserlis, being positive) $= \cdot 3742$. We have thus for the value of ξ corresponding to each value of X, cubic equations of the type. $\cdot 16\,\xi^3 + \cdot 3742\,\xi^2 + \xi = x/a$; where x is the distance of X from the constructive† Median. This

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* *J.R.S.S.*, LXXVII (1914), p. 426 *et seq.*

† *Cp.* above, p. 466.

Median is constructed by subtracting $\frac{1}{2}\kappa$, *i.e.*, ·1821 from the Mean 2·0228; say 1·84.

TABLE IV.—Showing the use of moments for the Method of Translation in a case of considerable abnormality.

X	0		1		2		3		4		5		?17
n ...		*17,546*		*118,542*		*70,411*		*20,241*		*5,873*		*2,639*	
x ...			− ·84		+ ·16		+ 1·16		+ 2·16		+ 3·16		? + 15·16
$1/a$ ...			− ·84997		·16711		1·18419		2·20127		3·21835		
ξ ...			− 1·0865		+ ·15721		+ ·83252		+ 1·2704		+ 1·6014		∞
Θ ...			·4378		·088		·3805		·4638		·4882		·5
θ ...		*·0622*		*·5258*		*·2925*		*·0833*		*·0244*		*·0118*	
U ...		*·0746*		*·5039*		*·2993*		*·0860*		*·02497*		*·0112*	
e ...		*− ·0124*		*+ ·022*		*− ·0068*		*− ·0027*		*− ·0006*		*+ ·0006*	
e^2/U ...		*·002*		*·001*		*·00015*		*·0001*		*·000015*		*·00003*	

X is the number of *lustra* measured from the age of 15. The figure 17, corresponding to 85 years (in addition to 15), is put as the extreme limit of X, on the supposition that the number of spinsters who marry after the age of 100 may be neglected.

x is the distance of X from the "constructive" *Median* (above, p. 466) 1·84.

$1/a = 1·01708$.

ξ is the negative root of the equation $·16\,\xi^3 + ·3742\,\xi^2 + \xi = x\,\frac{1}{a}$ (*x having its sign*).

Θ is the integral of the error-function between ξ and zero. θ, U, e have the same signification as in Table II.

$\text{S}e^2/\text{U} = ·0033$.

Table IV, utilizing these data, will require little explanation after that which has been given for the similar Table III. There was no row in Table III corresponding to the second row in Table IV showing the number of instances occurring in each interval, as the numbers pertaining to the former case had been already given in Table I. It may be noticed that the boundaries of the intervals or compartments, the successive values of X, are not here artificial limits separating discrete quantities, but actual numbers (of *lustra*).

If the result, with respect to the lower arm, is not as satisfactory as could be wished, it must be remembered that the case is one that is unfavourable to the use of moments; there being huddled into a single compartment so large a block of observations, more than fifty per cent. between the limits 1 and 2 (the ages 20 and 25). This is one of the cases favourable to the use of *percentiles*,* which I shall proceed to apply. But first it may be well to illustrate the use of percentiles by a simpler case, one in which there also occurs a large block of observations.

Just such a case is presented by Dr. Isserlis' first example, which shows "the theoretical frequency distribution of black balls in a draw

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* *Cp. J.R.S.S.*, Vol. LXXVII (1914).

" of four balls followed by one of three out of a bag containing four " white and six black balls, the draw being repeated 210 times." For the present I am not concerned with the *correlation* between the draw of four and the draw of three ; I utilize only the draws of four balls. Table V presents these data.

TABLE V.—*Showing the theoretical frequency of black balls drawn under certain conditions.*

X		0·5	1·5	2·5	3·5
Absolute frequency ...	1	24	90	80	15
Relative frequency ...	·00476	·11429	·42857	·38095	·07142

Before resorting to percentiles it may be well to see how we should fare with moments. For this purpose I take from Dr. Isserlis the Pearsonian coefficients $\beta_1 = \cdot 00390125$, $\beta_2 = 2\cdot 747768$. From the first datum we have our $\beta = \cdot 0005$; which we may treat as zero, thus greatly simplifying the solution. For ϵ we have $\frac{1}{12}(\beta_2 - 3)$ = say $- \cdot 021$. Employing the formula proper to the case in which β is zero* we have $\lambda = \epsilon - \frac{1}{3}e^2 + \frac{75}{4}\epsilon^3 =$ say, $- \cdot 0225$. Since χ, and with it κ, vanishes the constructive Median† is coincident with the mean; which is 2·4. The mean square of deviation is ·64; whence for "*a*" we obtain $\sqrt{\frac{1\cdot 28}{1 - 3 \times \cdot 0225 + \frac{15}{4} \cdot 0225^2}}$ say 1·1704. We have thus for the representation of the statistics the equation $x = 1\cdot 1704\,(\xi - \cdot 02252\,\xi^3)$; where x is the distance of any assigned point on the abscissa (of X) from the point 2·4, and ξ is the corresponding point for a normal curve with unit modulus. To determine the area between any assigned values of x we have, for the corresponding values of ξ, the cubic equation

$$-\cdot 0225\,\xi^3 + \xi = \frac{1}{a}\,x\,\left(\text{taking } \frac{1}{a} = \cdot 8544\right).$$

Solving this equation for $x = -\cdot 9, + \cdot 1$ and $+ 1\cdot 1$ respectively, I obtain the values of ξ entered in Table VI, and thence deduce the theoretical contents of the four compartments containing respectively the number of cases in which *either one or no* ball, *two* balls, *three* balls, *four* balls, were drawn. The calculated frequencies θ correspond fairly well with the observed frequencies U. The criterion Se^2/u proves to be ·07 nearly.

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* *J.R.S.S.* (1914), p. 425.

† Above, p. 466.

TABLE VI.—*Showing the use of moments for the method of translation in a case where there is no asymmetry.*

<table>
<tr><td>X ... ...</td><td></td><td colspan="2">1·5</td><td colspan="2">2·5</td><td colspan="2">3·5</td><td></td></tr>
<tr><td>x ... ...</td><td></td><td colspan="2">− ·9</td><td colspan="2">·1</td><td colspan="2">1·1</td><td></td></tr>
<tr><td>ξ ... ...</td><td></td><td colspan="2">− ·77936</td><td colspan="2">·0855</td><td colspan="2">·9597</td><td></td></tr>
<tr><td>Θ ... ...</td><td></td><td colspan="2">·3648</td><td colspan="2">·0481</td><td colspan="2">·41265</td><td></td></tr>
<tr><td>θ ... ...</td><td colspan="2">·1352</td><td colspan="2">·4129</td><td colspan="2">·36455</td><td colspan="2">·13545</td></tr>
<tr><td>U ... ...</td><td colspan="2">·119</td><td colspan="2">·4286</td><td colspan="2">·381</td><td colspan="2">·0714</td></tr>
<tr><td>e ... ...</td><td colspan="2">+ ·016</td><td colspan="2">− ·016</td><td colspan="2">− ·016</td><td colspan="2">+ ·016</td></tr>
<tr><td>e^2/U ... ...</td><td colspan="2">·0022</td><td colspan="2">·0006</td><td colspan="2">·0007</td><td colspan="2">·0036</td></tr>
</table>

To treat the case last adduced by way of *percentiles*, let us begin by determining the Median; which, in our now supposed ignorance or distrust of the moments, we cannot take for granted. Observing that above the point X = 2·5 there occur observations amounting to ·4524 of the total, we obtain for the proportion of the total between the point 2·5 and the Median ·0476. Likewise the proportion of the total between the Median and 1·5 is found to be ·381. We have therefore at first ignoring κ and λ as evidently small quantities to determine x_1, the distance of the point 2·5 above the Median and x_2 the distance in absolute quantity below the Median, the equation (1) $x_1 + x_2 = 1$ (2) $x_1 / x_2 = a\xi_1 / a\xi_2 = \xi_1/\xi_2$; where ξ_1 and ξ_2 are the fractions of the modulus—or of the standard deviation, if we prefer to use that parameter—which correspond respectively to the integrals of the probability curve (the $\frac{1}{2}\alpha$ of Dr. Sheppard). For a change, and in deference to modern usage I will on this occasion express the reasoning in terms of the *standard deviation*. Taking $\xi_1 = 1·1797$ and $\xi_2 = 1·4605$, I find for x_1 ·09, for x_2 ·91. It may be added here by anticipation that if after obtaining a value of κ and λ we utilize it to correct the Median no great change would result.

The second equation now becomes, ξ_1 and ξ_2, retaining the same values (in absolute quantity), $\dfrac{x_1}{x_2} = \dfrac{\xi_1 + \kappa\xi_1^2 + \lambda\xi_1^3}{\xi_1 - \kappa\xi_2^3 + \lambda\xi_2^3}$. Which equation when the provisional values of κ and λ are inserted gives in the present case values of x_1 and x_2 practically the same as before.

We have now to determine the coefficients of translation κ and λ so as to minimise the measure or criterion of error $\Sigma \dfrac{\mathrm{E}_r^2}{\mathrm{U}_r}$, where U_r is the given content of the r^{th} compartment and Σ_r is the error in the area of that compartment incurred by the use of coefficients κ and λ. Let us number the compartments from the extreme left I, II, III. . . . Then considering the values of the ξ's corresponding to boundaries of the compartments as obtained from observation, we may regard the error in the area of any compartment as due to the displacement of the x's by which it is bounded. Call the upper limit of the rth compartment x_r, and the lower limit x_{r-1}. Then if we suppose ourselves to know that leading coefficient of translation which has been called a, and its reciprocal h, we may write the error incurred at the upper limit $\frac{hx_r - \xi_r - \kappa\xi_r^2 - \lambda\xi_r^3}{1 + 2\kappa\xi_r \quad + 3\lambda\xi_r^2}\eta_r$, where η_r is the ordinate corresponding to the abscissa ξ_r in the curve with unit modulus or standard deviation; *provided that* the displacement from the normal distribution is small; that is, provided that κ and λ are small. The error at the lower limit of the compartment x_{r-1} is obtained by substituting $r-1$ for r in the above expression and changing the sign of the expression. Expanding the value of E_r thus expressed in ascending powers of κ and λ and neglecting powers above the second we have $E_r = Q_r h - P_r - \lambda(3Q''_r h - 2P''_r) + \lambda^2(9Q^{iv}_r h - 6P_r^2)$* + terms involving κ, — which I need not repeat from a former Paper, as they will not be required in the present case, since it appears by inspection that the group is nearly symmetrical, and therefore κ nearly $= 0$. In this formula Q_r is the *difference* $x_r\eta_r - x_{r-1}\eta_{r-1}$, and P is the difference $\xi\eta_r - \xi_{r-1}\eta_{r-1}$, $Q''_r = x_r\xi_r^2\eta_r - x_{r-1}\xi^2_{r-1}\eta_r$, P_r'' is the similarly constructed difference of $\xi_r^3\eta_r$; and so on. This notation, which is slightly different from that which I before employed, has the convenience that it is applicable below as well as above the Median without any change other than that which consists in giving ξ and x their proper signs. Now in the expression for E_r write for the absolute term, A_r; for the coefficient of λ, C_r; and for the coefficient of λ^2, H_r. Thus we have for E_r^2/U_r

$$\frac{1}{U_r}\left[A_r^2 - 2\lambda A_r C_r + \lambda^2(C_r^2 + 2A_r H_r)\right]$$

The sum of the quantities of this type is to be a minimum. Accordingly, differentiating the sum with respect to λ we obtain a simple equation for that *quæsitum*. That is supposing we know h exactly. But if we know h only approximately we should put for h, $h_o + \delta h$, where h_0 is the approximate value of h, and thus obtain two simple equations for the two quæsita λ and δh.

The calculation is exhibited in Table VII; which after the analogy of the earlier exposition† is divided into four parts. In this calculation, as in that earlier one, the *standard deviation* will be employed, not the modulus as mostly elsewhere in this Paper.

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* *Cp. J.R S.S.*, LXXVII (1914), p. 740.

† *J.R.S.S.*, LXXVII (1914) p. 742 and context.

Also I have followed my earlier practice in not here, as elsewhere in this Paper, making a distinction between entries which relate to the *boundaries* and those which relate to the *contents* of compartments. The reader is to understand that many of the entries, *e.g.*, the first five in Part I, relate each to a boundary of the compartment to which it pertains—the right or upper boundary.

TABLE VII.—Showing the use of percentiles for the method of translation in a case of no asymmetry.

PART I.—PRIMARY QUANTITIES.

No. of compartment	I	II	III	IV
X	1·5	2·41	3·5	4·5
x	− ·91	0	+ 1·09	+ 2·09
$\frac{1}{2}\alpha$	·38095	0	·42857	·5
ξ	− 1·1797	0	+ 1·4605	∞
η	·1989	·3984	·1373	0
U	·119	·381	·4286	·0714

PART II.—SECONDARY QUANTITIES.

(*a*)

No. of compartment	I	II	III	IV
$\xi\eta$	− ·2346	0	+ ·2005	0
P	− ·2346	− ·2346	+ ·2005	− ·2005
$\xi^3\eta$	− ·32655	0	+ ·4277	0
P″	− ·32655	+ ·32655	+ ·4277	− ·4277
$\xi^5\eta$	− ·45447	0	+ ·9124	0
P^{iv}	− ·45447	+ ·45447	+ ·9124	− ·9124

(*b*)

No. of compartment	I	II	III	IV
$x\eta$	− ·1810	0	+ ·14966	
Q	− ·1810	+ ·1810	+ ·14966	− ·14966
$x\xi^2\eta$	− ·2519	0	+ ·3912	
Q''	− ·2519	+ ·2519	+ ·3912	− ·3912
$x\xi^4\eta$	− ·3506	0	+ ·6809	
Q^{iv}	− ·3506	+ ·3506	+ ·6809	− ·6809

(*c*)

No. of compartment	I	II	III	IV
PQ	·04246	·04246	·03001	·03001
PQ/U ...	·3570	·1115	·0700	·420
Q^2	·03276	·03276	·022398	·0224
Q^2/U ...	·2753	·0860	·0523	·3137

$\mathrm{SPQ/U} = \cdot 9585$, $\mathrm{SQ^2/U} = \cdot 7273$.
$h = \cdot 9585/\cdot 7273 = 1\cdot 32$ nearly.

Part III.—Tertiary Quantities.

No. of compartment	I	II	III	IV
A	− ·005	+ ·005	− ·003	+ ·003
C	− ·285	+ ·285	+ ·408	− ·408
H	−1·43	+1·43	+2·6	−2·6

PART IV.—QUATERNARY QUANTITIES.

No. of compartment	I	II	III	IV
$-\left(\frac{dT}{d\lambda}\right)_o$ ...	$+ \cdot 012$	$+ \cdot 004$	$- \cdot 003$	$- \cdot 017$
$\left(\frac{d^2T}{d\lambda^2}\right)_o$ ...	$+ \cdot 7024$	$+ \cdot 2507$	$+ \cdot 3520$	$+ 2 \cdot 0916$
$-\left(\frac{d^2T}{\partial\lambda dh}\right)_o$ ...	$\cdot 4654$	$\cdot 1454$	$\cdot 13335$	$\cdot 8001$

$$\left(\frac{dT}{d\lambda}\right)_o = - \Sigma \frac{A_r C_r}{U_r} = \cdot 004$$

$$\left(\frac{d^2T}{d\lambda^2}\right)_o = \Sigma \frac{C_r^2 + 2A_r H_r}{U_r} = 3 \cdot 4$$

$-\left(\frac{d^2T}{d\lambda dh}\right)_o$ (the second differential of $\frac{1}{2}\Sigma \frac{E_r^2}{U_r}$ with respect to λ and h when for λ is put 0, and for $h_1\ h_o$) $= \Sigma \frac{Q_r C_r + 3Q_r'' A_r}{U_r} = 1 \cdot 54$.

From Part IV we can at once form the equations which give λ and δh, namely—

$$\left(\frac{d^2T}{dh^2}\right)_o \delta h + \lambda \left(\frac{d^2T}{dh d\lambda}\right)_o = - \left(\frac{dT}{dh}\right)_o$$

$$\left(\frac{d^2T}{dh d\lambda}\right)_o \delta h + \lambda \frac{d^2T}{d\lambda^2} = - \left(\frac{dT}{d\lambda}\right)_o$$

Remembering that $\left(\frac{d^2T}{dh^2}\right)_o = \Sigma \left(\frac{Q_r^2}{U_r^2}\right)_o$, which quantity is given by Part II of the table; and that $\left(\frac{dT}{dh}\right)_o$ vanishes by construction, since h_o is so taken as to make $\frac{dT}{dh} = 0$, we have for the simultaneous equations—

$$\delta h \ \cdot 727 - \lambda\ 1 \cdot 54 = 0$$

$$- \delta h\ 1 \cdot 54 + \lambda\ 3 \cdot 4 = - \cdot 004$$

from which λ is found to be about $- \cdot 025$.*

Some improvement is to be expected by varying the values of the coefficients h and λ which we found by the process of percentiles. It is possible, too, that a value of κ less insignificant than that to which we are committed by the use of moments might prove an improvement. There is, moreover, another resource which has not yet been utilized, the readjustment of the Median as proposed in a former Paper.* I postpone the exhibition of this readjustment as it is not very strikingly exemplified by the present case owing to the peculiar paucity of the compartments.

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* The agreement of this result with that found by moments is only apparent, since, as we are now working with *standard deviation*, the value of λ ought to be *half* what it was before. Consistently with the determination of λ as larger (in absolute quantity) than what corresponds to the previous calculation we might expect h to be smaller, a $(= 1/h)$ larger, which proves to be the case. The value of h found by percentiles is about $1 \cdot 32 - 2 \cdot 12 \times \cdot 02$, say $1 \cdot 28$, whereas it might have been expected to be $\sqrt{2}$ times larger than it was found by moments, that is, $1 \cdot 017 \times 1 \cdot 414$.

Not only does or may the use of percentiles give better values for the coefficients than the use of moments, but it also *must* give better results than moments or any other process. For the definition and essence of the construction by percentiles is to determine those values of the coefficients from which the given set of observations would with most probability have resulted; those values which minimise the Pearsonian criterion χ^2. They who accept that criterion as the definition of excellence in respect of good fit must admit that the use of percentiles has an advantage in this respect over any other process. Moreover, this advantage on the side of percentiles attaches to their use for the determination of the coefficients proper to other constructions besides the method of translation; in particular to the generalized law of error, as will appear in the sequel. Some advantage also may be claimed for constructions like ours, which admit of a process by which the construction acquires the highest degree of accuracy which it is capable of acquiring. Conceivably, of course, the best form of one construction may not be so good as the form of some other construction which first comes to hand.

I now go on to exemplify the use of percentiles in a more difficult case, namely, that which we above treated by way of moments, the distribution of ages at marriage, forming part of Dr. Isserlis' second example. Here there occurs the difficulty that we can no longer treat the coefficients κ and λ as small quantities of which the higher powers may be neglected. We must now start not from the zero, but from some substantial value of those coefficients (as well as of the coefficient called h). Such approximate values would often be furnished by a rough calculation based on movements which are not free from suspicions. Let us suppose that in this or some other fashion there has been obtained the approximate values with which we before started, namely, $\chi = \cdot 15 \ \lambda = \cdot 15$. Or rather, as we propose to show our impartiality as between the *standard deviation* and the *modulus* by once more using the former constant

$$\kappa = \sqrt{\chi} = \sqrt{\cdot 15}/\sqrt{2} = \cdot 27 \text{ nearly; and } \lambda = \frac{\cdot 15}{2} = \cdot 075.\dagger$$

With these initial values must be associated an approximation to h.

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[*] *J.R.S.S.*, LXXVII, p. 744, referring specially to data of a particular kind in respect of divergence from normality, but capable of being easily generalized.

[†] As to the transition from the *modulus* to the standard deviation *see J.R.S.S.*, LXXVII (1914), p. 306.

We shall take that value of h which best accords with the assumed values of κ and λ and the mean square of deviation which happens to be known in the present instance, namely, $h = 1\cdot26$.* Starting with these values for κ, λ, and h, we have then to determine their variations $\delta\kappa$, and $\delta\lambda$ and δh so as to minimize the criterion here called $\frac{1}{2}$T. Expanding in ascending powers of those increments, and differentiating with regard to each of them, we obtain the three equations :—

$$\begin{aligned}
\delta\kappa\frac{d^2T}{d\kappa^2} + \delta\lambda\frac{d^2T}{d\kappa d\lambda} + \delta h\frac{d^2T}{d\kappa dh} &= -\frac{dT}{d\kappa}\\
\delta\kappa\frac{d^2T}{d\lambda d\kappa} + \delta\lambda\frac{d^2T}{d\lambda^2} + \delta h\frac{d^2T}{d\lambda dh} &= -\frac{dT}{d\lambda}\\
\delta\kappa\frac{d^2T}{dh d\kappa} + \delta\lambda\frac{d^2T}{dh d\lambda} \quad \delta h\frac{d^2T}{dh^2} &= -\frac{dT}{dh};
\end{aligned}$$

it being understood that in each of the differential coefficients after performing the operation indicated we substitute for κ, λ, and h the above specified values.

We have now to substitute for T its equivalent $\frac{1}{2}\Sigma\frac{E_r^2}{U_r}$ and for each E_r its equivalent in terms of the assumed values for κ, λ, and h and the coefficients $\xi_r\ \eta_r$ obtained from observation by the use of tables; and thence to evaluate the coefficients of the three simultaneous equations.

But I hesitate to embark on so laborious a calculation without having made certain that the assumed initial values for κ, λ and h are sufficiently close approximations, so close that the resulting determinations for $\delta\kappa$, $\delta\lambda$ and δh will not be so large as to render the computation nugatory, based as it is on the assumption that powers of those increments above the second may be neglected.† I think it safer to proceed—in the earlier stages at least of the approximation—*pedetentim*, moving one foot only as it were, varying only one of the variables at a time. Let us thus step off with κ, and determine the value of $\delta\kappa$, which coupled with values of $\cdot075$ for λ, $1\cdot26$ for h ($\cdot27$ for κ) satisfies the equation which now reduces to $\delta\kappa\frac{d^2T}{d\kappa^2} = -\frac{dT}{d\kappa}$.

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* This presumptive value is thus calculated (with reference to the *standard deviation*)

$$h = \sqrt{\frac{1 + \chi + 3\lambda + \frac{15}{4}\lambda^2}{\mu_2}} = \sqrt{\frac{1 + \cdot073 + \cdot45 + \frac{15}{4}\cdot0225}{\cdot82942}}$$

$= 1\cdot26$ nearly. Of course, if we do not know even approximately μ_2, some other way of approximating to h must be contrived.

† *Cp.* above, p. 468.

We have at once

$$\frac{d\mathrm{T}}{d\kappa} = \frac{d}{d\kappa}\frac{1}{\mathrm{U}_r}\Sigma\mathrm{E}_r{}^2 = \Sigma\frac{1}{\mathrm{U}_r}\,\mathrm{E}_r\frac{d\mathrm{E}_r}{d\kappa}\text{; and }\frac{d^2\mathrm{T}}{d\kappa^2} = \Sigma\frac{1}{\mathrm{U}_r}\left(\frac{d\mathrm{E}_r}{d\kappa}\right)^2 + \Sigma\frac{1}{\mathrm{U}_r}\,\mathrm{E}_r\frac{d^2\mathrm{E}_r}{d\kappa^2}.$$

It remains only to evaluate E_r and its differential coefficients. Now E_r is the *difference* between the value of the expression $\frac{hx_r - \xi_r - \kappa\xi_r{}^2 - \lambda\xi_r{}^3}{1 + 2\kappa\xi_r + 3\lambda\xi_r{}^2}\eta_r$ for the values of x, ξ and η at the upper limit of any the rth compartment and what the expression when for r we substitute $r-1$, giving to x, ξ, and η their values at the lower limit of the compartment. Call the numerator (of the fractional part of) the above expression, Ω_r and the denominator, ω_r. Thus we may write $\mathrm{E}_r = \Delta\eta_r\frac{\Omega_r}{\omega_r}$; if we may use Δ in the rather unusual sense of the *difference* between the value of a function when r is put for a certain variable and what the function becomes when $r-1$ is put for that variable. Thus for $\frac{d\,\mathrm{E}_r}{d\kappa}$ we have

$$\Delta\frac{\omega\frac{d\Omega}{d\kappa} - \Omega\frac{d\omega}{d\kappa}}{\omega^2}\eta = \Delta\frac{\xi_r{}^2 - \lambda\xi_r{}^4 - 2x_r\xi_r}{\omega^2}\eta = \text{say } \Delta\frac{\phi}{\omega^2}\eta.$$

For $\frac{d^2\mathrm{E}}{d\kappa^2}$ we have (since ϕ does not involve κ) $\frac{-2\phi\frac{d\omega}{d\kappa}}{\omega^3}\eta = -\frac{4\phi\xi}{\omega^3}\eta.$

It now only remains to find the values of ξ and η pertaining to each compartment; say ξ_r and η_r pertaining to the upper limit of the rth compartment which are the same as the values pertaining to the lower limit of the $(r+1)$th compartment.* We begin by ascertaining the Median (the Median proper to the use of percentile as distinguished from the "constructive Median" used with moments). Now the number of observations above the point 2 on the axis X (the number of spinsters married at ages above 25) forms ·42152 of the total. There is therefore ·07848 of the total between the Median and the point X = 2. Likewise, there is found to be ·4254 of the total between the Median and the point X = 1. And the values of standard deviations, say, ξ_1 and ξ_{-1}, corresponding respectively to these areas are found (by Sheppard's tables) to be respectively $\xi_1 = \cdot 1981$ ξ_{-1} (without regard to sign) $= 1 \cdot 4425$. For the corresponding distance on the axis of X we have $x_1 = a(\xi_1 + \kappa\xi_1{}^2 + \lambda\xi_1{}^3)$; $x_{-1} = a(\xi_{-1} - \kappa\xi_{-1}{}^2 + \lambda\xi_{-1}{}^3)$. Thus, assuming κ to be approximately ·27 and $\lambda = \cdot 075$ we obtain for $\frac{x_1}{x_{-1}}$ an expression in terms of known quantities; which I evaluate at

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* The conventions here employed are explained above, p. 472.

·20928/1·1058. And $x_1 + x_{-1} = 1$. From which two equations I find $x_1 = ·16$ nearly, $x_{-1} = ·84$.*

Having located the Median, the value of x, being the distance positive or negative of any point on X from the median, the values of ξ corresponding to each utilized value of X are obtained from the given percentiles in the same way as ξ_1 is above calculated.

We have thus all the materials that are required for the calculation that is exhibited in Table VIII.

TABLE VIII.—Showing the use of percentiles for the Method of Translation in a case of considerable abnormality.

No. of compartment.	*1*		*2*		*3*		*4*		*5*	
X		1		2		3		4		?17
x		− ·84		+ ·16		+ 1·16		2·16		?15·16
$\frac{1}{2}\alpha$		·4254		·0785		·3778		·4638		·5
ξ		−1·4425		+ ·1981		1·164		1·7965		∞
η		·14095		·3912		·2026		·0794		0
Ω		+ ·0474		− ·0077		− ·1865		− ·3811		
ω		·6892		1·1158		1·9334		2·696		
$\frac{\Omega}{\omega}\eta$		·0097		− ·0027		− ·0195		− ·0112		
E	+ *·0097*		− *·0124*		− *·017*		+ *·0102*		+ *·0093*	
ϕ		−1·297		− ·0408		−2·1854		−7·34		
$\frac{\phi}{\omega^2}\eta$		− ·39		− ·0128		− ·118		− ·08		
$\frac{dE}{dk}$	− *·39*		+ *·377*		− *·1052*		+ *·04*		+ *·08*	
$-4\frac{\xi}{\omega}\frac{\phi\eta}{\omega^2}$ ...		−3·264		+ ·009		+ ·284		+ ·213		
$\frac{d^2E}{dk^2}$ ...	−*3·264*		+*3·273*		+ *·275*		− *·071*		−*.213*	
U	*·0746*		*·5039*		*·2993*		*·0860*		*·0362*	
$\frac{dT}{dk}$	− *·052*		− *·009*		+ *·0059*		+ *·00048*		+ *·0206*	
$\frac{d^2T}{dk^2}$ ...	*4·614*		*·2017*		*·0214*		*·0105*		*·42*	

X is age at marriage measured in units counting of periods of five years, from the age of 15.

x is the distance of X from the Median 1·84; a *signed* quantity.

$\frac{1}{2}\alpha$ is the proportion of the groups contained between X and the Median; a fraction derived from the data.

ξ is obtained by Dr. Sheppard's tables, being the *standard deviation* corresponding to the area $\frac{1}{2}\alpha$; ξ takes the *sign* of x.

η, which is identical with Dr. Sheppard's z, is also obtained from his tables.

$\Omega = h\,x_r - \xi_r - \kappa\xi_r^2 - \lambda\xi^3$; x and ξ having each its sign and the coefficients the initial values attributed to them in the present instance, viz.,

$h = 1·26$, $\kappa = ·27$, $\lambda = ·075$.

$\omega = 1 + 2\,\kappa\,\xi_r + 3\,\lambda\,\xi_r^2$.

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* Nearly coinciding with the position of the Median constructed by moments.

E is the value of $\frac{\Omega}{\omega}\eta$ for the upper limit of any, say the rth, compartment *less by* the value of $\frac{\Omega}{\omega}\eta$ at the lower limit of the compartment, the upper limit of the $(r - 1)$th compartment. For instance, as for the upper limit of the first compartment $\frac{\Omega}{\omega}\eta$ is $+ \cdot 0097$, the E pertaining to that compartment has the same value, since at the lower limit of the compartment $(- \infty)$ $\frac{\Omega}{\omega}\eta$ vanishes. For the third compartment $E = - \cdot 0195 + \cdot 0927$. For the second compartment alone, as it comprises the Median, the values of $\frac{\Omega}{\omega}\eta$ at the upper and at the lower limit are *added* together.

$\phi = \xi^2 - \lambda\,\xi^4 - 2\,x\,\xi\,k.$

$\frac{dE}{d\kappa}$ is related to the entries in the preceding row $\left(\frac{\phi}{\omega^2}\eta\right)$, just as E is related to the entries in the row preceding that of E.

$\frac{d^2E}{d\kappa^2}$ is similarly obtained from the entries in the preceding row.

$\frac{dT}{d\kappa}$ designates a row, containing the constituents of which that sum is formed, each constituent being of the form $\frac{1}{U_r}\frac{d}{d\kappa}\frac{1}{2}E^2_r = \frac{1}{U_r}E_r\frac{dE_r}{d\kappa}$.

$\frac{d^2T}{d\kappa^2}$ likewise designates constituents each of which is of the form

$$\frac{1}{U_r}\frac{d^2}{d\kappa^2}\frac{1}{2}E^2 = \frac{1}{U_r}\left[\left(\frac{dE}{d\kappa}\right)^2 + E\frac{d^2E}{d\kappa^2}\right].$$

Whence $\delta\kappa = -\frac{dT}{d\kappa}\Big/\frac{d^2T}{d\kappa^2} = \cdot 034/1 \cdot 97 = + \cdot 02$ nearly.

Using the improved value for κ, viz., $\cdot 29$, we may now go on to calculate the corrections for the other variables. And first for h; with respect to which the differential coefficients of T are particularly simple. For $\frac{dE}{dh} = \Delta\frac{\eta x}{\omega}$; $\frac{d^2E}{dh^2} = \Delta\left(\frac{dE}{dh}\right)^2$. With the aid of these equations and the data shown in Table VIII, I have roughly constructed another table, not shown here; from which I deduce for the approximate value of δh the small quantity $\cdot 005$.

The way is now open for an approximation to the best value of λ; the other coefficients being kept constant. Or rather, I think we have seen enough to hazard at this stage a frontal attack, a general advance effected by varying all three variables simultaneously.

There will thus be reached, if there has not been already reached, a stage at which we may with advantage effect a readjustment of the Median; whether separately, the other *quæsita* being treated as constant, or by a simultaneous variation of *four* variables. I will indicate the former simpler process.

Let us suppose that the position of the Median is in error by a small quantity, which we will call g, the true Median being to that extent above the apparent Median which we have used. Thus for every positive value of x which we have utilized it would have been more accurate to use $(x - g)$ and for every negative value $-x$ more accurate to use $-(x + g)$. Let us substitute then in T for each x *with its sign* $x - g$; expand T in ascending powers of g and neglecting terms involving powers of g above the second, determine the value of g which renders T a minimum, the other *quæsita* being treated as constant. The required value is given by the equation $g\frac{d^2T}{dx^2} = \frac{dT}{dx}$.

Here
$$\frac{dT}{dx} = \frac{1}{2}\frac{d}{dx}\Sigma\frac{1}{U_r}E_r^2 = \Sigma\frac{1}{U_r}E_r\frac{dE_r}{dx} = \Sigma\frac{1}{U_r}\Delta\frac{\Omega_r}{\omega_r}h\eta_r$$
$$\frac{d^2T}{dx^2} = \Sigma\frac{1}{U_r}\left(\frac{dE_r}{dx}\right)^2 \left(\frac{d^2E}{dx^2}\text{ vanishing}\right).$$

We have thus the materials for the calculation of g. I have exhibited the calculation in Table VIII: using the corrected value of κ, viz., ·29, but the original value of h 1·26. The student will observe how in the resulting expression for γ $(= gh)$ the denominator consists of a sum of squares; while the numerator suffers from the principle of mutually compensating variations. It is not surprising that the resulting fraction should be small.

Or is it easier to say that we should put for x measured in absolute quantity from the Median $|x| - g$ when the point x is above the Median and $|x| + g$ when the point is below the Median. It comes to the same, too, whether we call the first term in the expansion of $T - \frac{\gamma}{h}\frac{dT}{dx}$, x keeping its sign, or take x in absolute quantity, and change the sign of γ for elements below the Median.

TABLE IX.—Showing (1) improvement due to the connection made by Table; (2) readjustment of the Median.

No. of compartment.	I.		II.		III.		IV.		V.
ξ		−1·4425		+ ·1981		+1·164		+1·7965	
η		·14995		·3912		·2026		·0794	
U	·0746		·5039		·2993		·0860		·0362
Ω		·0072		− ·0845		− ·2136		·564	
ω		·6315		1·124		1·98		2·77	
$\frac{\Omega}{\omega}\eta$ ...		+ ·0016		− ·0029		− ·0219		+ ·0162	
E	+ ·0016		− ·0045		− ·019		+ ·0381		− ·0162
$\frac{\eta}{\omega}$		·2232		·348		·1023		·029	
$\frac{dE}{d\gamma}$ ...	− ·2232		− ·125		+ ·246		+ ·073		+ ·029
$\frac{dT}{d\gamma}$ ...	− ·00048		+ ·0011		− ·0156		+ ·0324		− ·013
$\frac{dT}{d^2\gamma}$ ...	·67		·031		·202		·062		·023

ξ, η, U are copied from Table VII.

The next four rows show the recalculation of E on the assumption that k is $\cdot 29$ (λ and h remaining unchanged).

$\frac{\eta}{\omega}$ is taken as essentially positive.

$\gamma = hg$, where g is the displacement of the Median in the positive direction.

$\frac{dE}{d\gamma}$ is obtained from differences of η/ω, as thus. For any compartment above the second $\frac{dE}{d\gamma} = \left(\frac{\eta}{\omega}\right)_{r-1} - \left(\frac{\eta}{\omega}\right)_r$. For the central compartment $\frac{dE}{d\gamma}$ consists of a decrease to the extent of the value of η/ω at the upper boundary, viz., $\cdot 348$, together with an *increase* to the extent of the value of η/ω at the lower boundary, viz., $\cdot 2232$; $- \cdot 348 + \cdot 2232 = -$ 125 nearly. Corresponding to the increase caused in compartment II by the value of η/ω at the boundary between compartment I and II there is a *decrease* in compartment I, a decrease not compensated by the value of η/ω at the lower boundary of the first compartment, since that lower boundary is at infinite distance.

$\frac{dT}{d\gamma}$ comprises constituents each of the type $\frac{1}{U} E \frac{dE}{d\gamma}$.

$\frac{d^2T}{d\gamma^2}$ comprises constituents each of the type $\frac{1}{U} E^2$.

$\gamma = \frac{dT}{d\gamma} / \frac{d^2T}{d\gamma^2} = \cdot 004/1 = \cdot 004$.

I trust that some of those who attach importance to the analytic representation of frequency statistics will complete and test the methods here partially exemplified, as soon as peace again affords leisure for such speculations. There are those who might perhaps be better employed in giving a trial to these new methods than in elaborating to the last decimal place the "probable errors" of the coefficients in a system of which the pre-eminence ought not to be regarded as assured, until such a trial has been made by competent and impartial statisticians.

SECTION II.—SOME NEW CONSTRUCTIONS.

Variations in the two principal methods which were proposed in former Papers and were exemplified in the preceding section form the subject of this section. I seek not fresh fields, but new paths in a field already opened up. Those who have followed me thus far will, I trust, not be deterred by the announcement that most of the modifications to be now suggested involve the use of *percentiles*. That procedure has been, I think, justified by the illustrations in the preceding section confirming the theoretical considerations previously advanced.* The use of percentiles can no longer be suspected on the ground that the principal percentile—the corner-stone of the calculation—the position of the Median, is in general, as compared with the Arithmetic Mean, arbitrary and indeterminate.* Rather, it is tenable that the Arithmetic Mean as compared with the Median is often incorrect. For where, as commonly, the data consist not of individual observations, or at least of minimum strips of area bounded by the frequency curve and two proximate ordinates, but integral blocks of area bounded by ordinates at a finite distance from each other, there the precision of the Arithmetic Mean is damaged by the existence of *all* such blocks of area ; whereas the Median is affected only by the central block. Especially at the extremities of a curve imperfectly articulated tracts of area are apt greatly to derange the Arithmetic Mean, while they do not disturb the Median at all. The advantage of the Median and the system of percentiles in respect of such extremities was not sufficiently emphasised in my penultimate Paper.† It is not merely that such tracts do often occur at the extremities, as Professor Pearson has complained ;‡ not only is the "tail" imperfectly jointed, but also it contains *heterogeneous* statistics. Without attempting to define heterogeneity in frequency statistics, we may affirm as one of its properties the presence of a class of observations the removal of which would render the rest of the group capable of a much simpler and more elegant representation. The obvious suggestion that the intruding element should be ejected is commonly not practicable. For the heterogeneous class is not defined merely by magnitude, nor any attribute that can be recognized by inspection. Criteria such as as those proposed by Pierce and others for the rejection of discordant observations are to be viewed with suspicion. We have often to cultivate the tares along with the wheat. Now it is very conceivable that for the purpose of a neat and useful representation descriptive of the group as a whole —especially of the main body as distinguished from the extremities—a treatment may be appropriate which would not be prescribed in the case of homogeneous statistics.* To adapt different methods of treatment to different kinds of observations is a main problem in the doctrine of errors-of-observation. Thus the Median might be pronounced worse than the Arithmetic Mean in the case of a normal group of observations on the ground that the probable error incident to the use of the Median is greater. Contrariwise the median must be pronounced better, on the ground of probable error, in the case of a curve which tapers abnormally at the centre.† But, indeed, "probable error" is not the last word in this matter. The choice of methods ultimately depends, rather, upon the condition that the detriment incident to error should be minimised.‡ Such is the view of Laplace and Gauss, which I accept as valid, not only for the *quaesitum* which they had specially in view, the determination of an objective quantity, but also—not to say *à fortiori*—governing the problem of which the object is to determine the form best representing a given frequency group. As to the measure of the detriment incurred by misrepresentation I am disposed to agree with Gauss (in his latest utterance on the question), that in the nature of the subject there exists some "arbitrariness" (Willkürlichkeit). A definite formula, such as Gauss proposed in an earlier and better-known utterance, or such as Laplace proposed in his Theory of Probabilities as the measure of a disadvantages "que l'on peut apprecier avec quelqu exactitude," § is not, I submit, in the nature of the subject. The matter is rather to be estimated by a sort of scientific common-sense. It is as if a person had to choose between two systems of cooking, one of which preserved rather more of the nutriment in food but exposed him to the risk of occasional poisoning, the other was proof against the danger of that catastrophe at the cost of some sacrifice in nutrition—a deficiency which to make up would require the use of a rather larger amount of raw materials. The choice might differ with differences of circumstance and temperament. But cases are easily conceivable in which commonsense would prefer the latter alternative. So when moments—including the Arithmetic Mean—based upon the extremities are open to suspicion, it may well occur that the most advantageous treatment of the data consists in the use of *percentiles*.

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* *See J.R.S.S.*, LXXVII (1914), pp. 304, 725.

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* It is true that the Arithmetic Mean has some advantage over the Median in respect of definiteness when we are dealing with discrete quantities (below p. 497) ; but outside games of chance this consideration seems not very important.

† *Per contra*, the advantage was somewhat exaggerated in my *antepenultimate* Paper read before the Congress of Mathematicians, 1912, where I claimed for the method of percentiles that it could *omit* suspicious data. Such a proceeding would be open to difficulties suggested by Professor Bowley in the passage cited below.

‡ *Contributions* II, *Trans. Royal Society* (1895), p. 395. "These statistics "suffer from a defect common to many of the class—the want of careful enumera- "tion of the frequencies near the beginning and end of the series. It cannot be "too often insisted upon that careful details of the frequencies in the start and "finish of the distribution are requisite."

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* The use of the Median as appropriate to "discordant observations" was recommended by me in the *Philosophical Magazine* for September, 1887. *See* also *Philosophical Magazine*, April, 1887, on "Discordant Observations." The subject has been treated by Dr. Sheppard in *Proc. Math. Soc.*, Vol. XXXI, 1899, p. 70.

† As I have pointed out in my essay on the Theory of Errors of Observation in the Cambridge Philosophical Transactions, 1885, and elsewhere, with reference to Laplace's *Method of Situation* (*Théorie Analytique, Supplement* 2).

‡ *See* as to this conception of the problem Section I of my Paper on the probable errors of frequency constants, *J.R.S.S.*, LXXI (1908), p. 386 *et seq.*: where the judgments of Laplace and Gauss are cited.

§ *Loc. cit.*, II, ch. iv. The analogy implied in Laplace's treatment of the subject between the detriment of erroneous measurement and the *mathematical expectation* of pecuniary loss is remote. The expectation of loss in *moral* fortune, to use the phrase of Laplace, would form a nearer parallel. But the question arises whether it is necessary to introduce the conception of *expectation*; whether we may not decide in any particular case—without reference to the "long run"—if it is worth while incurring a slight chance of a great failure. There is involved the distinction which I have discussed among the "first "principles" of probability in my article on that subject in the *Encyclopædia Britannica* (Edition XI, Vol. X, p. 379).

But I do not insist on the reader accepting the philosophical conceptions which satisfied Laplace and Gauss. It suffices to say that the use of percentiles avoids the difficulty which Dr. Bowley has expressed in some just and happy criticisms upon the generalized law of error: "if you were going to cut off the tail there was very "great difficulty in calculating your moments. The inclusion of an "item far down the curve affected the higher moment very greatly, "and you were in equal difficulty whether you included it or left "it out."* I include the tail, but avoid the difficulty which its inclusion is apt to cause.

The preliminary apology for percentiles may, I hope, secure a favourable reception to the following suggestions for their further use.

Use of percentiles for the generalized law of error.—My first proposal is to extend the use of percentiles to the generalized law of error, thus at length meeting the difficulty expressed by Dr. Bowley with respect to the application of that law. This extension might have been expected earlier; for it is analogous to the use of percentiles for determining the constants in the method of translation. After that analogy we first ascertain the approximate position of the Median; thence with the aid of other percentiles determine an approximate value for the modulus; then on the supposition—particularly appropriate in the case of the generalized law†—that the other constants are small, we find the values of those constants and the correction of the modulus which minimise the criterion of misfit; finally, if thought necessary, readjusting the position of the Median.

The procedure may best be explained by a simple example. One already taken from Dr. Isserlis, not presenting any asymmetry, is particularly convenient. This is the distribution of the numbers of black balls obtained in extracts of four balls under conditions above described.[*] Our first step is to ascertain the position of the Median. Proceeding as before, we find for its abscissa $X = 2 \cdot 41$. The next step is to calculate the modulus on the supposition that the group is normal.[†] We shall utilize only two percentiles, namely, that which occurs at the point $X = 3 \cdot 5$, distant $1 \cdot 09$ from the Median and that which occurs at the point $X = 1 \cdot 5$, distant $\cdot 91$ from the Median. Now for the area contained between the upper of those points and the Median we have $90/210 = 3/7 = \cdot 42857\dot{1}$; and for the area intercepted between the lower point and the Median $80/210 = \cdot 381$. Corresponding to these respective values of intercepted area—the $\frac{1}{2}\alpha$ of Dr. Sheppard, the $\frac{1}{2}$H of Dr. Burgess—we obtain from the tables of the latter for the abscissa on the normal curve with unit modulus, corresponding to the upper point $x = 1 \cdot 09$, $\xi = 1 \cdot 036$, and corresponding to the lower point $x = \cdot 91$, $\xi = \cdot 834$ (without respect to sign). The corresponding values of η, the ordinate of the normal curve, are respectively $\cdot 193$ and $\cdot 281$. We have now to substitute these values in 2T, the general expression for the criterion of misfit, which may be written in the present case :—

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* *See* the discussion of my Paper "On the Generalized Law of Error," *J.R.S.S.*, LXIX (1906).

† The limits to which the coefficients of the generalised law all put the Modulus (and the Mean) are restricted and will be considered in the following section.

$$\frac{1}{U_{-1}}\left(x_{-1}h - \xi_{-1}\right)^2 \eta_{-1}^{\;2} + \frac{1}{U_1}\left(x_1 h - \xi_1\right)^2 \eta_1^{\;2}$$

Putting $U_{-1} = 8/21$, $x_{-1} = -\cdot 91$, $\xi_{-1} = -\cdot 834$, $U_2 = \frac{3}{7}$, $x_1 = 1 \cdot 09$, $\xi_1 = 1 \cdot 036$, I find for T an expression which becomes a minimum when $h = \cdot 93$.

Here arises the nice question whether—although we are seeking a representation only for the main bulk of the group, between the points $X = 1 \cdot 5$ and $X = 3 \cdot 5$—we should not for the purpose of determining the approximate modulus take into account the areas at the extremities, including them in the χ^2 (or rather χ^2/N)[‡] which we seek to minimise. The question is not very important, as we are only seeking a *start* for further approximation to the value of the modulus. If the question is answered in the affirmative, the only difference produced in our procedure will be to substitute for $\frac{1}{U_{-1}}\left(=\frac{21}{8}\right)$ the coefficient of the first square in the expression that is to be minimized, $\frac{1}{U_{-1}} + \frac{1}{U_{-2}}$, $(= 11 \cdot 025)$, U_{-2} being the area of the outmost compartment to the left, viz., 25/210* ; and similarly at the upper extremity to make a change of *weight* from $\frac{7}{8}$ to $16\frac{1}{3}$. The effect is inconsiderable ; to change the trial value of h from ·93 to ·913. I have adhered to the former value.

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[*] Above, p. 470.

[†] *Cp. J.R.S.S.*, LXXVII (1914), p. 734 *et seq.*

[‡] The data consisting in this case of *theoretical* frequencies, *no* N is given. The Pearsonian criterion may be employed for any assigned value of N. *Cp.* p. 462 above.

We have now, putting h provisionally = ·93, to find the correction thereof δh and the coefficient i so as to minimise the error incurred. Here the question which has just been dismissed recurs in a more serious form. Should the system of errors which is to be minimised include the extremities which we do not profess to represent ? It appears to me reasonable to prescribe only for the body of the given group, and having regard to that portion only of the data which we profess to represent, to find the values of the coefficients which make that representation best. But if this view is not accepted, and we should put for the criterion of misfit χ^2/N based on *all* the compartments, it is easy to adapt the following procedure to this modification of the problem.†

Looking only at the interior compartments, in the present case only two, we have to minimise an expression of the form : $\frac{1}{U_{-1}} e_{-1}^2 + \frac{1}{U_1} e_1^2$; where e is the difference between the given area of a compartment U and what it becomes when we put for the coefficients in the generalized law of error $h + \delta h$ and i (j = 0). We have now once more‡ to choose between the simultaneous determination of δh and i or the method of approximation which proceeds step by step. I adopt the latter, which is often, I think, the more convenient, especially to begin with. So, keeping h fast, I consider e as made up of two portions : (1) the integral of the normal probability curve η between the point corresponding to x_1, that is, $x_1 h$, say ξ_1, and zero, say (ξ_1)§ and (2) the integral of (the second term of the generalized law) $\frac{1}{4!}\, i\, \frac{d^4\eta}{d\xi^4}$ between the same limits, that is, $i\left(\frac{1}{2}\xi_1 - \frac{1}{3}\xi_1^3\right)\eta_1$. Putting h = ·93, we have ξ = ·93 × 1·09 = 1·0137. Whence (by Burgess's Tables) I find θ (the Sheppardian $\frac{1}{2}\alpha$)‖ = ·42415 and $\eta_1 = \cdot 1669$. Also $\frac{1}{2}\xi_1 - \frac{1}{3}\xi_1^3 = \cdot 1596$. Accordingly we have for the constitutent of 2T, the expression which is to be minimised (remembering that $U_1 = \frac{3}{7} = \cdot 42857$)

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* *See* Table I above, p. 458.

† The resulting difference in the value of i is considerable, considered as a percentage of i. The difference is presumably less considerable when, as usual, the number of compartments is greater than in the present instance.

‡ *Cp.* above, p. 477.

§ It need hardly be observed that *this* ξ is different from the one used in obtaining an approximate value for the modulus.

‖ The integral before written Θ and the difference θ coincide in the present simple case.

$$\frac{7}{3}\left(\cdot 42415 + i \times \cdot 1669 \times \cdot 1596 - \cdot 42857\right)^2 = \frac{7}{3}\left(i \times \cdot 0266 - \cdot 00442\right)^2.$$

By parity of computation I find for the lower compartment $\xi = \cdot 8463$, $\theta = \cdot 38432$, $\eta = \cdot 2757$. Whence (U being now $21/8 = 2 \cdot 625$) we have, proceeding as before,

$$2T = \frac{7}{3}\left(i \cdot \times \cdot 0266 - \cdot 00442\right)^2 + \frac{21}{8}\left(i \times \cdot 061 + \cdot 00337\right)^2.$$

Equating to zero the first differential coefficient of T we have $i \times 1 \cdot 1419 = - \cdot 0265$, $i = - \cdot 023$.

To proceed to the correction of h, let us call the errors in the areas of the respective compartments incident to the provisional assumption of $h = \cdot 93$ $i = - \cdot 0231$, e'_1 and e'_{-1} respectively. Thus for $2T'$ the quantity that is now to be minimized by the determination of δh we have $\frac{1}{U_1}\left(x_1 \eta_1 \delta h + e'_1\right)^2 + \frac{1}{U_{-1}}\left(x_{-1} \eta_{-1} \delta h + e'_{-1}\right)^2$.

From the values above given I find $x_1 \eta_1 = \cdot 18$ nearly; $e_1 = - \cdot 023 \times \cdot 0266 - \cdot 00442 = - \cdot 005$ nearly. Similarly evaluating the other constituent of $2T'$ we obtain for the quantity to be minimised

$$\frac{7}{3}\left(\cdot 18\,\delta h - \cdot 005\right)^2 + \frac{21}{8}\left(\cdot 25\,\delta h + \cdot 002\right)^2.$$

Equating to zero the differential with respect to δh we have $\delta h \times \cdot 24 - \cdot 0008 = 0$, $\delta h = \cdot 003$ nearly.

With the value of δh (to be added to $h_o = \cdot 93$) and the value of i which have been found we can now obtain the very small errors e''_1 and e''_{-1}. Whence we can determine, proceeding as before, or rather by simultaneous equations, the further corrections δh and δi which make the criterion a minimum.

I now go on to the more general case in which the asymmetry and with it the coefficient j does not vanish. We have now to take account of the circumstance that the generalised law of error referred to the Median, as is now proper, can no longer be appropriately expressed by the same formula as when it is referred to the centroid. Assuming that the third and higher powers of j may be neglected* the position of the Median is at a distance of $-\frac{1}{3}$ j from the centroid;† and the equation referred to the Median as origin becomes (for unit modulus)

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* The assumption will be considered in the sequel.

† Dr. Bowley has utilised this property in his *Elements of Statistics* (Second Edition).

$$\eta = \frac{1}{\sqrt{\pi}} e^{-\xi^2} \left[1 - \mathrm{j}\left(\frac{4}{3}\xi - \frac{4}{3}\xi^3\right) + \quad . \quad . \quad \right];$$

the second term of the approximation, the term affected with i, not being sensibly modified. Accordingly for the integral between ξ and zero we have $\Theta(\xi) \mp \mathrm{j}\,\frac{2}{3}\,\eta\,\xi^2 + \ldots$; where Θ and η, as usual, denote the integral and ordinate of the normal curve, and the negative or positive sign is to be used according as ξ is positive or negative. We are thus in a position to minimize the error in the areas of the compartments.

As an illustration I take the statistics of barometric heights at Churchstoke furnished by Professor Pearson.* Let X now designate the number of tenths-of-an-inch measured from an origin on the *right*, as shown in the first row of Table X. The second row gives the number of observations in each interval of a tenth-of-an-inch. The third row gives x the distance of X from the Median. The Median is found by methods indicated in the former Paper.† The value there given is 299·743. But the correction there indicated (in a note), the correction exemplified in the preceding section,‡ reduces this value slightly. Having regard to the convenience of a round number when tables have to be consulted, I have taken as the Median 299·7425. The difference between this figure and each value of X, namely x, taken in this table without respect to sign (in absolute quantity), is to be multiplied by an approximate value of h in order to calculate approximate values for the areas of the compartments. For the approximate value of h I take that which I found before when treating the same statistics by a different method for the what I called the quasi-modulus; § rather what I found before, as the calculation was conducted in terms of *standard deviation*, was the quasi-modulus × $\sqrt{2}$. The value then found for that constant was ·284; which has therefore to be divided by 1·414 . . so as to obtain an approximation we now require. Say h (provisionally) = ·2; and we pass at once to the values of ξ by dividing each value of x by 5. From ξ I obtain by Dr. Burgess's

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* Used in a former paper to illustrate the method of translation, *J.R.S.S.*, LXXVII (1914), p. 737 *et seq*; where it is inadvertently said that the case is one of no "kurtosis." What should have been said is that the coefficient of translation which is specially correlated with kurtosis—which vanishes when there is no kurtosis *and no asymmetry*—is zero or very small in this case.

† *J.R.S.S.*, LXXVII, p. 782. The reference to this passage made in the note to a later page (p. 737) is inexact.

‡ Above, p. 471.

§ *Loc. cit.*, pp. 734, 739.

TABLE X.—Showing use of percentiles for the generalised law of error.

X	304·5		302·5		301·5		300·5		298·5		297·5		296·5		294·5
n		367		279		353		637		273·5		253		319	
x	4·7575		2·7575		1·7575		·7575		1·2425		2·2425		3·2425		5·2425
ξ	·9515		·5515		·3515		·1515		·2485		·4485		·6485		1·0485
Θ ...	·4108		·2823		·1904		·0848		·13735		·23705		·32015		·43095
θ		·1285		·0919		·1056		·22215		·0997		·0834		·1105	
U ...		·1256		·0955		·1208		·218		·0936		·0866		·1092	
e		+ ·003		− ·0036		− ·0152		+ ·004		+ ·006		− ·003		+ ·0013	
η	·2282		·4162		·4986		·5514		·5304		·4614		·3705		·1879
Φ	·1376		·0844		·0412		·0084		·0218		·0620		·1038		·1377
$\pm\phi$ ...		+ ·0532		+ ·0432		+ ·0328		− ·0134		− ·0402		− ·0418		− ·034	
e' ...		+ ·008		+ ·0007		− ·012		+ ·0027		+ ·002		− ·007		− ·002	
Ψ	·043		·0908		·0804		·0408		·0626		·0896		·086		·144
ψ		− ·048		+ ·01		+ ·04		+ ·1		·027		− ·0035		+ ·058	

X denotes barometric heights in tenths of an inch.

n is the number of observation between consecutive values of X.

x is the distance of X from the Median 299·7425.

$\xi = \xi \times h$; $(h = \cdot 2)$.

Θ is the probability-integral from 0 to ξ.

θ is formed from Θ by taking differences; except for the central compartment.

U is the given proportionate number of observations.

$e = \theta - \text{U}$.

η is the ordinate of the unitary normal-curve corresponding to the abscissa ξ.

$\Phi = \frac{2}{3}\,\eta\,\xi^2$.

$\pm\,\phi$ is the difference between consecutive values of ϕ affected with the *sign* proper to each constituent of the sum $\Sigma \frac{1}{\text{U}_r}\,(\pm\,\text{j}\,\phi_r + e'_r)^2$ which is to be minimised. (In the central compartment $-\,\cdot 0134$ is $\cdot 0128 + \cdot 0084$.

$e' - \pm\,\text{j}\,\phi + e$ when $\text{j} = \cdot 1$.

$\Psi = (\frac{1}{2}\,\xi - \frac{1}{3}\,\xi^3)\,\eta$

ψ is the difference between consecutive values of Ψ; except the middle compartment, where the *sum* is used.

Tables* Θ the equivalent of half Dr. Burgess's H, Dr. Sheppard's $\frac{1}{2}\alpha$. θ, the area of a compartment (calculated on the supposition of normality), is obtained by taking the difference between successive values of Θ. Thus for the compartment bounded by X = ·297·5 and X = 298·5 the area from the centre to the upper limit of the compartment is ·2370 and from the centre to the lower limit is ·1373; and accordingly the area of the compartment is ·0997. The area of the central compartment bounded by X = 298·5 and X = 300·5 is found by *adding*† the values of Θ pertaining to its two boundaries, viz., ·0848 + ·1373. The values of θ thus found are now compared with U, the observed area of each compartment. I have found the values of U by counting up the number of observations given in detail on p. 454 of Professor Pearson's Memorandum on barometric heights and dividing each sum by the number of observations in the entire group. For example, in our central compartment, between the heights 300·5 and 298·5 there occur 637 observations, and accordingly U = 637/2922 = ·218. The difference between θ and the corresponding value of U is called e.

The erroneousness shown by the hypothesis of a normal curve with modulus 5 is now to be reduced by introducing the (small) coefficients j and i and the correction of the inverse modulus δh. Let us begin with j. For this purpose we form the values of the expression $\frac{2}{3}\xi^2\eta$, here called ϕ (not the same as the ϕ in Table II). Then the best value of j is to be found by minimising the criterion. $\Sigma \frac{1}{\mathrm{U}_r}\left(e_r \pm \mathrm{j}\,\phi_r\right)$; where the positive sign is to be taken for compartments below the central, the negative sign for compartments above. Performing the operation I find for j ·1; a result which is in respectable agreement with the value of j obtained by way of moments, viz.: ·125.‡ The errors attending the system h = ·2, j = ·1 (i = 0) may be designated e'.

The way is now open to a further approximation by putting as the error of each compartment $e'_r + \mathrm{i}\,\psi_r$, where ψ_r has the same signification as in Table II, viz., $\frac{1}{2}\xi_r - \frac{1}{3}\xi_r^3$, without respect of sign. To find the best value of i we have now to minimize the criterion $2\mathrm{T}' = \Sigma \frac{1}{\mathrm{U}_r}\left(\mathrm{i}\,\psi_r + e'_r\right)^2$. Performing the operation which is required for ascertaining the best value of i, I find it to be ·04; which is in close agreement with the value derived from moments, namely $\cdot 05 \left(= \frac{1}{4}(\beta_2 - 2)\right)$. Taking ψ_r for each compartment and multiplying it by i I find a new system of errors e'' pertaining to the supposition that the given group is represented by a "generalized" error-curve with modulus 5 and for the constants j and i respectively $\cdot 1$ and $\cdot 04$.

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* Referred to above, p. 458

† *Cp.* above, p. 460.

‡ According to Professor Pearson (*Phil. Trans.*, A, Vol. CXC (1897), p. 431), his β_1 = ·12578, β_2 = 3·18891 for Churchstoke barometric heights. Whence our j = $\sqrt{\beta_1/8} = \sqrt{\cdot 0157}$ = ·125; our i = $(\beta_2 - 3)/4$ = ·18891/4 = ·05 nearly.

It is now open to us to proceed to further approximations by determining, simultaneously or step by step, δh and the corrections of j and i, δj and δi. Or the result which has been reached may be used to give another illustration of the process by which the location of the Median is to be readjusted. Remembering that e''_r, the error pertaining to any compartment $= \theta_r \mp \cdot 1\ \phi_r + \cdot 04\, \psi_r$ (where the negative sign is used for compartments above the centre), let us introduce the consideration that x in being measured from the apparent Median 299·7425 has been measured from an origin which ought rather to have been $299 \cdot 7425 + g$, where g is a small correction. Accordingly in e''_r for compartments above the Median it is proper to substitute for θ_r or its equivalent $\int_{\xi_{r-1}}^{\xi_r} \eta\, d\,\xi$ (where ξ_r and ξ_{r-1} are the upper and lower boundaries of the rth compartment) the integral $\int_{\xi_r - 1 - gh}^{\xi_r - gh}$; the corrections of e'' which are affected with products g j and g i being negligible. Thus the correction of e''_r for a superior compartment as we may call one above the central compartment is, $\gamma\,(\eta_{r-1} - \eta_r)$, if we put γ for $g\,h$. The expression is the same for an inferior compartment if we are counting r from the extreme left and according to the conventions employed in a former example. But if x_r with ξ_r is measured in absolute quantity, and r counted from the Median, then the sign of the correction will be different on the opposite sides of the Median; it will be $\gamma\,(\eta_{r-1} - \eta_r)$ for a superior, and $-\gamma\ (\eta_{r-1} - \eta_r)$, r measured from the centre. I leave it to the student to perform this operation, reminding him include the extreme observations* which have so far been excluded† that it is a question whether a calculation of this kind should not (except so far as account has been taken of their *number*).

Blend of moments and percentiles.—The topic to which we now proceed would have been anticipated just now, if treating the method of translation by way of percentiles, we had adopted for one of the constants the value given by moments, *e.g.* ·05 for i. If a coefficient derived from moments is thus to be grafted on the process of percentiles, there is a propriety in selecting those coefficients to which moments are particularly suited. Now there is some reason to think that, in cases not very abnormal, the Mean and the Modulus are best determined by moments.* Accordingly, in applying the generalised law of error, the following blend of processes may be recommended. Determine the Mean and the Modulus, as usual, by moments; then find the coefficients j and i by the process proper to percentiles.

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* *Cp.* above, p. 486-7.

† 213 observations of barometric height greater than 304·5 tenths and 227·5 observations at the other extremity have been thus left out of account. (*Cp.* above, p. 463.)

We have not far to seek for an example of this procedure; for in the last example illustrating the use of percentiles for the generalised law the value of h which we adopted on trial as approximative, namely, ·2, happens to be very nearly identical with the value of the inverse modulus determined by moments, viz., $1/\sqrt{2} \times 12 \cdot 6642$. If then we used for h ·198 . . , and then proceeded to find j by the procedure proper to percentiles, the work would not have differed much from that which has been exhibited

For another example of the suggested blend I take some statistics which I have already employed to illustrate the simple use of uncompounded moments.† Again utilising data for which I am indebted to Dr. Isserlis, I put for the Mean 3·2494 (sometimes abridged to ·249) for the Modulus 1·8228 (sometimes abridged to 1·823). Thence I find the values of ξ, the distance from the Mean divided by the Modulus, for all the given points which define the data within a certain range,‡ excluding the extremities. The values of θ and also of U are the same as those recorded in Table II. So are the values of ϕ. Accordingly, to determine the best value of j we have, attending to the distinction of sign between the upper and lower arms of the curve,

$$2\mathrm{T}^{1} = \frac{1}{\cdot 2105}\left(\cdot 168\,\mathrm{j} - \cdot 0173\right)^2 + \frac{1}{\cdot 2970}\left(\cdot 0723\,\mathrm{j} - \cdot 001\right)^2$$
$$+ \frac{1}{\cdot 2548}\left(\cdot 171\,\mathrm{j} - \cdot 0072\right)^2 + \frac{1}{\cdot 118}\left(\cdot 091\,\mathrm{j} - \cdot 0075\right).$$

Differentiating with respect to j, equating to zero and reducing, I find for j, ·07; a result which is in fair accord with the value of the coefficient obtained by moments, viz., ·065.§

We may now substitute the value of j which has been found in the expression for the error of each compartment by $(\theta_r - \mathrm{U}_r + \mathrm{j}\phi_r + \mathrm{i}\psi_r) = (e'_r + \mathrm{i}\psi_r)$; where, as before, $\psi_r = (\frac{1}{2}\xi_r - \frac{1}{3}\xi_r{}^3)\eta_r$. The value of i is now to be determined by minimising the criterion $2T' = \Sigma \frac{1}{U_r}\left(i\,\psi_r + e'_r\right)^2$. I leave it to the reader to perform the operation, reminding him that it will not, like the similar operation on a preceding page, admit of improvement by closer approximations to h and the position of the Median. For by hypothesis the value of the modulus and the location of the centre of the curve are given by the first two moments. Of course (consistently with that hypothesis) j and i admit of closer approximation, say by the simultaneous determination of δj and δi.

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* See *J.R.S.S.*, LXXVII (1914) p. 304

† *Cp.* above, p. 465.

‡ *Cp.* above, p. 463.

§ *Cp.* above, p. 459.

TABLE XI.—Showing a blend of moments and percentiles used for the Method of Translation.

X	1·5		2·5		3·5		4·5		5·5
x … …	−1·7494		−·7494		·2506		1·2506		2·2506
ξ … …	−·9595		−·4109		·1377		·6863		1·235
Θ … …	·4126		·2194		·07715		·3341		·4596
θ … …		*·1932*		*·2965*		*·2620*		*·1255*	
U …		*·2105*		*·2976*		*·2548*		*·1180*	
e … …		*−·0173*		*−·001*		*+·0022*		*+·0075*	
η … …	·2247		·4765		·5536		·3523		·12275
ξ^2 …	·92064		·16884		·01896		·471		1·5252
Φ … …	·2511		·0828		·0105		·1813		·2719
ϕ … …		*·1683*		*·0723*		*·1708*		*·0906*	

X denotes proportionate number of trumps (held in the first hand at whist)—treated as continuous quantity.

$x = X - 3{\cdot}2494$ (the Mean).

$\xi = x \div 18228$ (the Modulus).

Θ is the probability integral (often called $\frac{1}{2}\alpha$) from zero to $\pm\,\xi$.

θ is the calculated area of a compartment on the supposition that the normal law of error

U is the given area of a compartment.

$e = \theta - U$.

η is the ordinate of the normal curve without modulus at the point ξ.

$\Phi = \frac{1}{3}(\eta_0 - \eta + 2\eta\xi^2)$ where $\eta_0 = {\cdot}56419$.

ϕ is obtained by taking the difference between consecutive values of Φ; except for the central compartment, as to which see the text.

Mixed modes are equally available in the Method of Translation. I give an instance taken from my earliest exposition of that method in the *Journal of the Royal Statistical Society* for 1898; which was confined to the *second* approximation, that which is characterised by the coefficient now called κ (not taking account of λ). In that first investigation the *quaesita* were a the distance from a certain origin of the point which forms the centre of the generating normal curve; and c the modulus of that curve. The distance of any point on the abscissa of the given group $= (a + c\xi)^2$ where ξ is the abscissa of a corresponding percentile on the normal curve with unit modulus. It was shown how to ascertain the constants a and c not only from (the first three) *moments* but also by way of *percentiles.* For the latter purpose two simple equations were constructed from the observed percentiles for the two unknown quantities (ac) and c^2. I take now *two* of the systems formed from unmanipulated percentiles, viz.,

$$(1)\ (2ac) \cdot 702 - c^2 \times \cdot 36353 = 3$$
$$(2)\ (2ac) \cdot 644 - c^2 \times \cdot 29389 = 3$$
$$\overline{\text{I}\ \ (2ac)\, 1 \cdot 346 - c^2 \cdot \cdot 6574 = 6}$$

Adding these two equations I obtain a single equation which is based upon *four* percentiles. This I will now combine with an equation obtained from moments; one of those that we have been using in recent calculations. For this purpose I will first renovate the old notation employed in equation I, observing that "$2ac$" in the earlier construction corresponds to the "a" of the present and penultimate Paper, and "c^2" to ($k =$) $a\kappa$ of the later notations. The first equation thus becomes

$$\text{I}\ a\ (1 \cdot 346 - \kappa \cdot 6574) = 6.$$

For the second equation we have

$$\text{II}\ a^2\ (1 + \kappa^2) = 2\mu_2 = 21 \cdot 8024.$$

Eliminating a we obtain for κ a quadratic equation of which the (positive and only appropriate) root is $\cdot 085$, a value closely corresponding to that which was obtained in the earlier investigation and that which is obtainable by more recent formulæ.*

The principle which has been exempified for the *second* approximation may easily be extended to the *third.*

Obiter the attention of the student may be called to the convenient use of simple equations based on the given percentile; whereby first approximations at least to the rough variables are easily obtainable.†

One other combination of the processes seems to deserve special notice, namely, the use of moments to supply approximative or trial values from which to start the procedure proper to percentiles. For example, the value of i given by moments, which we adduced in a preceding example, might have been used for a start whence to obtain δi (and δj) by way of percentiles.

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* The quantity corresponding in the 1898 Paper to our present κ was $c^2/2ac$; which was found to be (*loc. cit.*) $\cdot 4/4 \cdot 4$ *i.e.*, $\cdot 09$ nearly. From the abridged general formula (*J.R.S.S.* LXXI, p. 310), we obtain $\cdot 085$; as thus: $-\beta_1$ (as given by Professor Pearson)

$$= \cdot 1311\ \beta = \tfrac{1}{8}\beta_1 = \cdot 0164\ \chi = \tfrac{4}{9}\beta = \cdot 0073\ \kappa = \sqrt{X} = \cdot 85.$$

† As proposed in my Paper read before the Congress of Mathematicians, p. 9 (of the Paper); where attention is called to the imperfection of the method in that it does not take account of the different weights of the percentiles. I will return to the subject in a later section of the present Paper.

Supplementary constants furnished by percentiles.—If percentiles can thus improve the result of moments by securing additional precision for the constants, might they not also improve the result by adding a new constant? The generalised law of error affords an opening for such an addition in the terms following those which we have utilised, which are in our notation $\frac{1}{5!}\mathrm{k}_3\frac{d^5\eta}{d\xi^5}$ and $\frac{1}{6!}\mathrm{k}_4\frac{d^6\eta}{d\xi^6}$. But practically the constants k_3 and k_4, involving fifth and sixth moments, are not available. Theoretically, too, much more complicated terms, involving higher powers of i and j, would have to be coupled with k_3 and k_4 if we are to keep to the law of error. But need we keep to the pure law? Why not add a term formed by substituting a new constant, say q, for either k_3 or k_4, in one of the above expressions and then from the given percentiles, having regard to the errors of each compartment incurred by the use of constants already determined, determine q so as to minimise the criterion of error. The *second* of the corrections, the term $\mathrm{q}\,\frac{1}{6!}\,\frac{d^6\eta}{d\xi^6}$, may be recommended as preferable, since it avoids trouble connected with the change of sign of the variable on the negative side of the origin. Thus the integral from 0 to ξ of the additional term would be $\mathrm{q}\,\frac{1}{6!}\,\frac{d^5\eta}{d\xi^5}$;* whereby the integral of the expression from ξ_{r-1} to ξ_r could be found, and employed as suggested to determine the best value of the supplementary constant. Or if this addition should seem a monstrosity in the case of the generalised law of error, whose one claim to regard is theoretical purity, it may still be worth considering whether it might sometimes be expedient to add a supplementary term to an empirical construction, in particular the Method of Translation.†

Discrete data treated by percentiles.—So far we have treated the data as continuous; a theoretical frequency corresponding to each indefinitely small interval between consecutive ordinates. But, in fact, in some instances, such as those presented by Dr. Isserlis' first and third examples, the data are discrete; an integer number of events—balls drawn, or trumps held—occurring an integer number of times. The distinction is not thought to affect the use of moments seriously; at least when the number of categories, the number of points on the abscissa, with corresponding ordinate, is not very small—a condition not fulfilled by Dr. Isserlis' first example. The absence of continuity affects the use of percentiles in a much less degree. In fact, the primary conception of the process relates to discrete categories, few or many, and the integer number of events belonging to each category; the respective numbers occurring in the indefinitely long run compared with the occurrences in a short, but not very short,* run. If it is given that there were held (in the hand of the first player) five trumps 2,950 times out of 25,000 deals, we are not obliged to think of these 2,950 events, as distributed continuously between the points 4·5 and 5·5 of an abscissa represents number of trumps. That portion of the group need not be figured as a rectangle standing on the line bounded by the points X = 5·5 and X = 5·5; nor yet as a trapezium nor a series of "trapezettes," nor a chamber bounded by a curved ceiling. The theory of Probabilities does not forbid our conceiving—what mechanically indeed it is not very easy to conceive—the 2,500 trumps piled one above the other at any point in the interval between 4·5 and 5·5—say perpendicularly athwart the abscissa in a card-case of enormous height and such tenuity as not to admit of two cards standing abreast. But when we seek to determine the Median † the hypothesis of continuity cannot be, I think, entirely despensed with. Some form of graduation, such as that proposed by Lagrange,‡ may be required. Also the first approximation for the quasi-modulus must be made in some other fashion than that which has been most adopted in our examples. Otherwise, I think, the treatment of discrete data presents no peculiarity except a certain simplicity. It might be described as a mode of using percentiles without recourse to tables of the probability integral, with the aid only of ordinary logarithms.

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* *i.e.*, $\mathrm{q}\ (-\frac{1}{6}\,\xi + \frac{2}{9}\,\xi^3 - \frac{2}{45}\xi^5)$. This expression for the integral, like the expression for the ordinate from which it is obtained, is only available for values of ξ of the order unity or less.

† There is indeed a peculiar affinity between the supplementary term here proposed and the generalised law of error. As the terms in the generalised law affected with j and i are not available for the calculation of the *ordinate* beyond a range which is of the order unity (*one* modulus), yet are available up to infinity for the calculation of *moments*, so it is with the supplementary term. And the third and fourth moments as given by the j and i terms are not disturbed by the supplementary q term, since the integral $\int_{-\infty}^{\infty} \xi^t\,\frac{d^6}{d\xi^6}\eta\,d\xi$ (where η is the ordinate of the normal curve with unit modulus) vanishes for values of t from zero up to 5 inclusive.

To illustrate this construction let us consider first the simplest case: that in which the data consist of a "histogram" with ordinates

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[*] Consider the instance given in my paper read before the Congress of Mathematicians (1912), Section III; a large number of balls drawn at random from an immense melange, comprising seven classes, distinguished by the seven prismatic colours.

[†] Or more generally some fixed point from which as it were to hang the construction; as to which conception see *J.R.S.S.*, LXII (1909), p. 8.

[‡] The method of approximation illustrated in *J.R.S.S.*, L (1898), p. 8.

at equal intervals, each representing a given number of observations, say U_r, corresponding to x_r; and the *quæsitum* is an analytical function representing the ordinates. Let the sought function be $f(x; a, b, c \ldots)$; where $a, b, c \ldots$ are frequency constants. Suppose that we have obtained approximate values $a_o, b_o, e_o \ldots$ for these constants. Then we may substitute for $a, b \ldots$ $a_o + \delta a$, $b_o + \delta h \ldots$ respectively; expand in ascending powers of δa and $\delta b \ldots$, and determine the values of those increments which minimise the criterion $\Sigma \frac{1}{U_r} \left[f(x_r, a \; b \ldots) - U_r \right] \Delta x$; where Δx is the finite equal interval between consecutive values of x.* A particularly simple sub-case is presented when one (or more) of the coefficients, say b, is known to be small. Then we may put 0 for b_o and b for δb. This variety is presented generally by our generalised law of error, and frequently by our method of translation.

For example, let the *quæsitum* be the ordinate of a translated curve in which the coefficient κ is small, and the coefficient λ may, initially at least, be left out of account. Then we may identify the "a" of the last paragraph with the constant so designated in the statement of our method. For b we are to put 0, and for δb, κ. The form of the function f is assigned by considering it as *translated* from a normal curve with unit modulus, say the curve $\eta = F(\xi)$, by putting for ξ its value in terms of x derived from the equation $x = a(\xi + h\,\xi^2)$, and also of $d\xi$ its equivalent $\frac{d\xi}{dx}\,dx$.† We thus obtain for $f(x)\,dx$ the expression

$$dx\,F(\xi) \Big/ \frac{dx}{d\xi} = dx\,F(\xi) \Big/ a\,(1 + 2\,\kappa\,\xi);$$

when for ξ we substitute its equivalent in terms of x, that is, $hx - \kappa\,h^2 x^2 \ldots$, where $h = 1/a$. Making the substitutions, and neglecting terms involving second and higher powers of κ, we have

$$f(x)\,dx = dx\,\frac{h}{\sqrt{\pi}}\,e^{-(hx - \kappa\,h^2 x^2)^2}\,(1 - 2\,\kappa\,h\,x)$$

$$= \frac{h}{\sqrt{\pi}}\,e^{-h^2x^2}\left[1 + \kappa\,(2\,h^3x^3 - 2\,hx)\right].$$

Let e_r be the error presented by subtracting $\Delta x\,U_r$ the given proportion of observations at any point x_r from what it would be if it were accurately represented by a normal curve with modulus $1/h$: viz., $\Delta x\,\frac{h}{\sqrt{\pi}}\,e^{-h^2x^2}$. Put for hx, ξ' (differing from ξ by a small quantity), η' for $\frac{1}{\sqrt{\pi}} e^{-\xi'^2}$, and ϕ for $(2h^3x^3 - 2hx)\eta'$. Then the best value of κ is to be obtained by minimising the expression

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* *Mutatis mutandis* when the given intervals are not equal.

† *J.R.S.S.*, Vol. LXXVII (1914), p. 306 *et seq.* and the Congress Paper there referred to.

$$\Sigma \frac{1}{U_r}\Big[\, e_r + \kappa \phi_r \Big]^2$$

I give an example consisting of discrete data which have been treated on earlier pages as if the quantity were continuous.* It will be noticed that the values of X are not now boundaries within which the given integers are supposed to be enclosed but the integers themselves. The Median being placed as before at the point 3·225, the distance of each integer from that point is registered as x. ξ' is the corresponding abscissa for the unitary normal curve on the provisional assumption that the constant $h = \cdot 54$. The value for κ extracted, viz. ·04, is of the same order as that found by other methods.

TABLE XII.—Showing the use of percentiles for the Method of Translation, the data being treated as discrete quantities.

X	1	2	3	4	5	6
x	−2·225	−1·225		+ ·775	+1·775	+2·775
ξ'	−1·2015	− ·6615		+ ·4185	+ ·9585	+1·4985
y	·0718	·1970		·25569	·1216	·032
U ...	·0689	·2104		·25484	·118	·0341
e	+ ·0029	− ·0134		+ ·00085	+ ·0036	− ·0021
ξ'^3 ...	−1·728	− ·2895		·0733	·8806	3·364
ϕ	− ·0756	+ ·1686		− ·1726	− ·019	·119

X = (integer) number of trumps (held in first hand at whist).

$x = \text{X} - 3\cdot 225$ (the approximate Median).

$\xi' = x \times \cdot 54$ (the approximate value of h).

$$y = \cdot 54 \frac{1}{\sqrt{\pi}} e^{-\xi^2}$$

U = given frequency.

$e = y - \text{U}$.

$\phi = y\,(2\,\xi^3 - 2\,\xi)$

$$2\,\text{T} = \frac{(\cdot 0756\kappa - \cdot 0029)^2}{\cdot 0689} + \frac{(\cdot 1686\kappa - \cdot 0134)^2}{\cdot 2104} + \frac{(\cdot 1726\kappa - 00085)^2}{\cdot 25484}$$
$$+ \frac{(\cdot 019\kappa - \cdot 0036)^2}{\cdot 118} + \frac{(\cdot 119\kappa - \cdot 0021)^2}{\cdot 034}$$

$$\frac{d\,\text{T}}{d\,\kappa} = 0\,;\ \cdot 078\kappa = \cdot 0028\,;\ \kappa = \cdot 04 \text{ nearly.}$$

It may be observed that this method of dealing with ordinates is applicable to constructions which have not, like ours, the advantage of an easily manageable expression for the area subtended by any finite portion of the abscissa. If we may take an ordinate multiplied by the interval as representing the element of area, we have then only to compare with the true area the area so constructed from the proposed formula for the ordinate and approximate values of the coefficients ; and thence by the process proper to percentiles to obtain corrections of the coefficients. Nor are we limited to so simple a conception of the relation between the ordinates, nor to a single ordinate. Say the data pertain to intervals of the abscissa x_{r-1}, x_r, x_{r+1} . . . ; and that we are given the content of frequency whether continuous or discrete between each consecutive pair of points, such as x_r and x_{r+1}. Suppose that there is an ordinate $x_{r+\frac{1}{2}}$ between x_r and x_{r+1} or more than one such intercalated ordinate. Express the area subtended by the length $x_r\,x_{r+1}$, by means of Simpson's or some cognate rule, in terms of the ordinates x_r, $x_{r+\frac{1}{2}}$, x_{r+1} (or a greater number of points ranging from x_r to x_{r+1} inclusive) and those ordinates in terms of the sought coefficients ; and then improve the coefficients by the process of percentiles. This kind of correction appears to be of universal applicability. There is room for improvement of this sort even in the great Pearsonian Types. Though on the wing of *moments* that species may soar like the eagle above the others, still a wren-flight to a somewhat higher position can be effected with the aid of *percentiles.*

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* *Cp.* above, p. 465.

(*To be continued.*)

THE INCREASE IN THE COST OF FOOD FOR DIFFERENT CLASSES OF SOCIETY SINCE THE OUTBREAK OF WAR.

By FRANCES WOOD.

EACH month since the outbreak of war the Board of Trade have published in their *Labour Gazette* index numbers showing the increase in the retail price of all the principal articles of food since July, 1914, and a general index number for all food, obtained by combining the different articles in the proportions to be found in a typical working class family budget. The figures are based upon returns from between 500 and 600 places, and relate to upwards of 7,000 establishments. Considering that quite a small sample, if well chosen and evenly distributed, is sufficient to give reliable index numbers for retail prices, we have no cause to quarrel with the extent of the data upon which these figures are based, especially in the case of large towns. But a difficulty arises when we try to interpret the figures by translating them into terms of corresponding increases in weekly household bills for food. When the Board of Trade index number shows an increase of 50 per cent. in the retail price of food (all commodities combined) does it mean that, if a pre-war standard is to be maintained, the bills for food in all households in the United Kingdom show approximately a similar increase; and that, if the necessary money is not forthcoming, either a change of diet, or a diminution in the amount of food consumed is necessary?

In order to throw some light upon this point, I have, during the last nine months, collected from my friends rough estimates of the increase that has taken place in the cost of feeding their respective households at various dates since the outbreak of war. These estimates differ considerably among themselves, but they all agree in one particular, namely, in showing a smaller increase than the corresponding Board of Trade figures would suggest, whether the weights used are those suitable for working class expenditure, or whether the weights are roughly adjusted to bring them more into line with the expenditure on different articles of food in a middle class family. In none of these cases has there been any obvious change in the standard of living. The experience of working class housewives, on the other hand, is said to have been the reverse of this, and, according to a number of letters and articles which have appeared in the Press from time to time, among the poor the cost of food has increased to a greater extent than the official figures would suggest.

It is not difficult to suggest a number of reasons why the experience of middle class housewives should point to a more favourable state of affairs than is indicated by the Board's figures. In the first place, for such a household there are great possibilities of variation in diet, and especially at a time like the present, when various commodities have risen in price to very different degrees, the increase in the cost of food can be reduced by a simple readjustment of diet of such a nature as almost to pass unnoticed. In many middle class households the increase in the price of meat and fish has been partially met by reducing the amount of meat and fish consumed and increasing instead the quantity of vegetables containing proteids. If this is done skilfully members of the households need not be any the wiser or any the worse for it, but such a rearrangement on a large scale is impossible. The Board of Trade figures, however, make no allowance for such changes, and as a matter of fact, it would be a very difficult matter to do so on scientific lines. In extreme cases some adjustment seems called for. It is absurd, for example, to give fish the same weight now as at the beginning of the war.

In the second place, in the case of commodities for which more than one quality is available, the middle classes can reduce their weekly expenditure on food by consuming a cheaper quality than formerly. The larger the sum of money normally spent on food, the greater the scope for this kind of economy when prices are high. The standard of living of the poor is normally so low that any substitution of cheaper qualities is, for the most part, out of the question, and it is with the middle classes that this particular type of economy has been principally in vogue during the past two years. The saving thereby effected is often considerable. By substituting margarine for butter, for example, an increase of 33 per cent. up to July 1, 1916 (the percentage increase in the price of butter), could have been changed into a decrease in expenditure of anything from 15–30 per cent. according to the quality of margarine purchased. During the earlier months of the war, foreign meat was substituted for English meat in many houses, and this was partly responsible for the relatively greater increase in the price of foreign meat that took place. Latterly the amount of foreign meat available for private consumption has fallen far below the pre-war level. This has put a stop to this particular type of substitution on the part of the wealthier; but at the same time it has meant that a section of the poorer classes has been forced to reverse the process, *i.e.*, to substitute English for foreign meat.

The question of allowing for (*a*) possible changes in diet, and (*b*) the substitution of one quality of food for another in the preparation of retail prices index numbers is an exceedingly difficult one. For, even it were conceded that such an allowance were desirable, it would be a matter of very great difficulty to carry out the necessary adjustments statistically. Up to the present, food index numbers have always been prepared on the assumption that, during the period under discussion, no changes either in diet or in the quality of the commodities under discussion have taken place. Since these two conditions are frequently not fulfilled the figures have a theoretical value, but do not necessarily coincide with actual experience. The very poor are the class least able to avail themselves of these two devices to meet rising prices, and it is for this reason that a sudden rise is always felt more severely by them than by a class of people who normally live considerably above the subsistence level.

There is still a third reason why the level of expenditure at present should be relatively low in middle-class, and relatively high in working-class, households. Where more than one quality of a commodity is habitually sold it has almost invariably happened that, during the last two years, the price of the cheapest quality has risen the most. In some cases the Board of Trade give index numbers for only the cheapest quality, *e.g.*, granulated sugar, but in other cases an average for all qualities is given as the index number of the commodity in question. Thus, in the case of meat, the index numbers for beef are the mean of the figures for British and foreign meat: and the index numbers for British and foreign beef are, in their turn, the average of the figures for " ribs " (taken as typical of the dearer joints) and " thin flank " (taken as typical of the cheaper joints). The index numbers for mutton are obtained in a similar manner. If the price of all the different joints and qualities moved together, this method of calculation would be sufficiently accurate, but since the price of the cheaper joints and qualities has increased very much more than that of the dearer ones, the actual index numbers for all food published by the Board of Trade show too favourable a situation when expenditure by the working classes is considered, and too gloomy a state of affairs in the case of the middle classes.

In the following table figures are given contrasting the rise in price of the different qualities and joints of beef and mutton at three-monthly intervals since the outbreak of war. The figures, which have been taken from the *Labour Gazette*, are for large towns only. Unfortunately a similar comparison is not possible for sugar, bacon and tea, as the official figures refer to one quality only.

TABLE I.—*Increase in the retail price of meat at quarterly intervals since the outbreak of war. Large towns (populations over 50,000).*

(Level of prices in July, 1914 = 100.)

	Percentage increase since July, 1914.			
	September, 1914.	October, 1914.	June,* 1915.	September, 1915.
All Beef	**12**	**16**	**46**	**54**
(*a*) British beef	7·5	9	40	46·5
(1) "Ribs"	6	7	35	40
(2) "Thin flank"	9	11	45	53
(*b*) Foreign beef	17	23	52	61
(1) "Ribs"	12	16	43	51
(2) "Thin flank"	22	30	61	71

	Percentage increase since July, 1914.			
	December, 1915.	March, 1916.	June. 1916.	July,† 1916.
All Beef	**51**	**56**	**85·5**	**86·5**
(*a*) British beef	43·5	47	75	76
(1) "Ribs"	36	39	62	62
(2) "Thin flank"	51	55	88	90
(*b*) Foreign beef	59	64·5	96	97
(1) "Ribs"	50	55	84	85
(2) "Thin flank"	68	74	108	109

	Percentage increase since July, 1914.			
	September, 1914.	October, 1914.	June,* 1915.	September, 1915.
All Mutton	**13**	**16**	**42**	**49**
(*a*) British mutton	8	9·5	35·5	40·5
(1) "Legs"	5	5	29	30
(2) "Breast"	11	14	42	51
(*b*) Foreign mutton	18·5	22·5	48	57
(1) "Legs"	14	18	38	47
(2) "Breast"	23	27	58	67

	Percentage increase since July, 1914.			
	December, 1915.	March, 1916.	June, 1916.	July,† 1916.
All Mutton	**47**	**57·5**	**92**	**91·5**
(*a*) British mutton	37·5	45·5	73	74
(1) "Legs"	27	33	56	57
(2) "Breast"	48	58	90	91
(*b*) Foreign mutton	56	69·5	111	109
(1) "Legs"	45	54	91	90
(2) "Breast"	67	85	131	128

* The figures for June, 1915, are for large and small towns combined, as separate returns for this month are not shown in the *Labour Gazette*. Only average figures for meat are given for March, 1915, so this month has been omitted.

† Figures for July, 1916, have been included as being the latest available at the time of going to press.

There is no question of the conclusion to which the figures in the preceding table point. For example, by July 1, 1916, the price of foreign beef had increased by 21 per cent. more than the price of British beef; while foreign "thin flank" showed a 47 per cent. greater increase than British "ribs." The figures for mutton are even more significant. The increase in foreign mutton was 35 per cent. greater than the increase in British mutton; while the increase in foreign "breast" was considerably more than double the increase in the case of English "legs." Official figures for bacon, tea and sugar are not available, but a study of the prices charged by four or five London firms points to a similar state of affairs. With regard to butter the situation is rather different, if margarine be looked upon as the cheapest quality of butter. In this case the poor score, for the increase in the price of margarine has been very much less than the increase for any quality of butter.

A variety of reasons could be given to account for the relatively high level of prices in the case of cheap meat; but the following are probably the most important. In the first place, the shortage and high price of freights, &c., must have had the effect of sending up the price in this country of all kinds of Colonial and Foreign produce; and in the second place, the huge demands on the part of the Government for foreign meat for the Army coupled with the attempt to substitute foreign for British meat on the part of the middle classes during the early months of the war, must have had a similar effect upon prices. Whatever the causes may be, it is not possible, in these circumstances, to give one series of food index numbers to apply to rich and poor alike, but instead one must prepare separate series of figures for the different classes of society, using in each case only those particular kinds and qualities of commodities habitually consumed by the class in question. It was originally my intention to prepare a number of such series to apply to the different sections of Society from the wealthy to the very poor, but I have found it impossible to do this with anything approaching accuracy for either the wealthy class or the middle classes generally. The difficulty consisted in estimating the relative importance of the different commodities for these two classes. As far as I know there is no collection of well-to-do family budgets from which a series of weights could safely be prepared. In normal times, it might be sufficiently accurate to use a system of weights prepared from such data as one could collect personally, relying on the well-known fact that in dealing with index numbers relatively large changes in weights produce comparatively little effect upon the final figures. But at a time like the present, it would be very unsafe to rely upon this. The prices of different commodities have increased by such very varying amounts, that the weights used would undoubtedly have a considerable influence in determining the magnitude of the final figure, and it would be rash to depend upon a system of weights based upon the returns of a minute sample of the population. With regard to the wealthiest class, it is difficult to say whether the increase in the price of food has been greater or less than the official figures. It is certainly clear that for the wealthy the percentage rise in the price of meat has not been so great as for the working classes. It is quite safe to say that for the middle classes generally the cost of food has not increased to the extent that the official figures would suggest. The reasons for this conclusion have already been dealt with.

In the case of the working classes I have calculated fresh series of index numbers for what I will call the artisan class, and the very poor class, using for each class only those particular kinds of commodities which they are in the habit of consuming. I have assumed (*a*) that the artisan class is in the habit of eating all joints of foreign and the cheaper joints of British meat, and equal quantities of cheap butter and margarine, and (*b*) that the very poor consume only the cheap joints of foreign meat and margarine instead of butter. Unfortunately a similar analysis cannot be made in the case of sugar, tea or bacon.

The appropriate weights to be used can readily be obtained from the Board of Trade's Report on the Cost of Living in 1905. In that Report the Board published the results obtained from the collection of 1,944 working-class family budgets. These were divided into five classes according to the amount spent on food. The weights obtained from a consideration of the relative amounts spent on the different articles of food by (*a*) the class spending the least, and (*b*) the class spending the most, on food have been used in calculating index numbers showing the increase in the cost of food for the very poor and for the artisan class respectively.

In certain districts the artisan class is said to insist upon having the best joints of British meat, the best fresh butter and so forth. I have prepared a third series of index numbers for this special type of artisan, not because I imagine that the type is a frequent one, but because the figures themselves provide an interesting comparison with the other two series. I am not so much concerned with calculating the increase in the cost of food for any one particular class or classes as with demonstrating that the values obtained differ considerably according to the kind and quality of the commodities considered, and that consequently, as prices continue to rise, more than one series of combined index numbers should be prepared in order to obtain accurate figures which can be directly applied to particular classes of society.

Index numbers showing the increase in the cost of food as a whole, at quarterly intervals since the outbreak of war, and calculated in the manner indicated above, are given in the following table for (*a*) the special artisan class, (*b*) the ordinary artisan class, and (*c*) the very poor class, and, for comparison, the figures published by the Board of Trade. The index numbers for individual commodities have, in every case, been taken from the Board of Trade *Labour Gazette*, and apply only to large towns.

TABLE II.—*Increase in the retail price of food for certain classes of society at quarterly intervals since the outbreak of the war. Large towns (populations over* 50,000).

Level of prices in July, 1914 = 100.

Class of society.	Percentage increase since July, 1914.			
	September, 1914.	December, 1914.	June,* 1915.	September, 1915.
Board of Trade figure	11	17	32·5	37
Special artisan class	10	15	31	36
Ordinary artisan class	13	19	35	40
Very poor class	15	20	40	44

Class of society.	Percentage increase since July, 1914.			
	December, 1915.	March, 1916.	June, 1916.	July,† 1916.
Board of Trade figure	46	51	62	65
Special artisan class	45	49	58	61
Ordinary artisan class	50	55	68	70
Very poor class	52	61	75	77

* The figures for June, 1915, are for large and small towns combined, as separate returns are not shown for this month in the *Labour Gazette*. Average figures only for meat are given in the Gazette for March, 1915, so this month has been omitted.

† Figures for July, 1916, have been included as being the latest available at the time of going to press.

The amount by which the price of food has increased varies considerably for the different classes, especially during the later months. In every case the increase for the very poor has been the greatest; the increase for the ordinary artisan class the next in magnitude, while for the class which has been assumed to live upon the most expensive food the increase has been the least. The Board of Trade's index numbers throughout are greater than the figures for the special class, and smaller than the figures for the ordinary artisan class. They are much smaller than the figures for the very poor. The biggest difference for any one month is shown for June, 1916, when in large towns the increase for the most prosperous class of working people was 17 per cent. less than for the poorest. For this month the calculated figure for the poorest class was 13 per cent. higher than the Board of Trade figure. In these calculations no allowance has been made for the different qualities of sugar, tea and bacon consumed by the three classes, and if this could have been done, the differences shown would have been still more marked. Moreover, no allowance has been made for the fact that the classes with the lowest standard of living are least able to meet rising prices by a re-arrangement of diet or by the substitution of cheaper qualities of food. It is thus perfectly clear that by far the biggest increase in the cost of food has, during the past two years, fallen upon the class least able to bear it.

The index numbers published by the Board of Trade are of great value in showing the increase in the price of food for the United Kingdom as a whole, but they are in the nature of an average for the different classes of society, and cannot be taken as representing closely the experience of a large section of the working classes. When it was only a question of an increase in prices of one or two per cent. over a whole year, there was no need to calculate more than one series of final index numbers, but now that the average price of food has risen by over 60 per cent. in the course of two years, it undoubtedly is necessary to have more than one series of numbers if the figures are to be put to practical use. It will become still more necessary if further increases in the price of food take place in the future.

REPORT OF THE COUNCIL

For the FINANCIAL YEAR *ended December* 31, 1915, *and for the* SESSIONAL YEAR *ending June* 20, 1916, *presented at the* EIGHTY-SECOND ANNUAL GENERAL MEETING *of the* ROYAL STATISTICAL SOCIETY, *held at the Society's Rooms*, 9, *Adelphi Terrace, Strand, London, W.C., on June* 20, 1916.

THE Council have the honour to submit their Eighty-second Annual Report.

The roll of Fellows on December 31 last, as compared with the average of the previous ten years, was as follows :—

Particulars.	1915.	Average of the previous Ten Years.
Number of Fellows on December 31	772	857
Life Fellows included in the above	163	173
Number lost by death, withdrawal, or default	61	57
New Fellows elected	12	47

Since January 1 last, 22 new Fellows have been elected, and the Society has lost 25 by death, resignation, or default, so that the number on the list, excluding Honorary Fellows, on June 20, 1916, is 769, a decrease of 20 over the previous sessional year.

Since June last year the Society has lost by death the undermentioned Fellows :—

		Date of Election.
d p	*Beverley, The Right Hon. Mr. Justice Henry	1869
d	Bishop, George	1881
	Dale, Augustus Charles, I.S.O.	1910
	Hunt, William	1915
	*Manson, Frederick W.	1884
d	Merton, Zachary	1884
	Narayan, Lachmi	1913

* Life Fellow.
d Donor to the Library.
p Contributed a Paper to the Society's Transactions.

		Date of Election.
	*Nathan, Henry	1878
d	Phelps, E. Bunnell, M.A.	1908
d	Provand, Andrew D.	1886
	Ridley, The Right Hon. Viscount	1909
	Van Raalte, Marcus	1888
c d p	*Welby, The Right Hon. Lord, G.C.B.	1873
	Whinney, Frederick	1887
	Whitbread, Samuel	1859

* Life Fellow.
c Member of the Council.
d Donor to the Library.
p Contributed a Paper to the Society's Transactions.

Though the death-roll during the past year has been less heavy than during the preceding year, the Society has again to deplore the loss of several Fellows of many years standing.

The regretted death of the late President, the Right Hon. Lord Welby, who had shown a keen interest in the welfare of the Society, necessitated under the Rules the election of a new President for the remainder of the Session, and the Right Hon. Lord George Hamilton, President of the Society during the Sessions 1910-12, was good enough again to undertake the duties on the invitation of the Council.

Both the late Mr. Justice Beverley and Mr. A. D. Provand had been donors to the Library on different occasions, and in the death of Mr. Samuel Whitbread, the Society loses one of its senior Fellows.

The Council regret to announce that H. G. Marshall, who had been the Society's messenger and resident housekeeper since February, 1911, died in September last year. It has been decided that his widow be allowed to remain for the present as resident housekeeper.

Since June, 1915, the following new Fellows have been elected:—

Abd El Kereem, M.A., F.R.E.S.
Carruthers, William.
Chapman, H. Epton.
Falk, Oswald Toynbee.
Fitzpatrick, Thomas.
Goodman, Arthur Frank.
Hartwell, Alfred.
Hodge, J. P. (*restored to List*).
Jenkins, William Whiteford.
Keating, Matthew, M.P.
Lewis, Alfred E.
Loveday, Alexander.
Lupton, L. E.
Madsen, Arthur Wilhelm, B.Sc. Edin.
Melglave, Maurice.
Orensteen, Myer M.
Penton, Edward.
Read, John Armstrong.
Saltmarsh, Sir George.
Snell, Roy Albion.
Taylor, J. Allen.
Wilson, George B.

The list of elections, though a short one, is somewhat longer than the record of new Fellows elected in the preceding year, and, as stated last year, it was to be expected that the war would cause an increase in the resignations and a decrease in the average number of new Fellows elected. The Council appeal, however, to the Fellows to aid in maintaining the strength and efficiency of the Society by inducing suitable persons to join its ranks, as it is evident that the financial outlook of the Society is such as to cause some anxiety for the future, although the immediate financial condition of the Society as shown in the accounts and Report of the Auditors appended hereto has been considerably improved since December 31, 1914, owing to the economies effected.

The expenditure on salaries and wages has been reduced from 615*l.* to 480*l.*; the expenditure on the *Journal* from 813*l.* to 448*l.*, and miscellaneous expenses from 348*l.* to 243*l.* The Society has thus been enabled to repay the overdraft of 158*l.* due to Messrs. Drummond at the end of 1914 and to close the year with a credit balance of 124*l.* It should be stated, however, that owing to the stress of other work the expenditure on the Library, more especially on binding, has been less than was intended, and it must be remembered that on the conclusion of the war the liabilities of the Society in respect to salaries will inevitably increase.

A summary of the income and expenditure of the Society for the past twenty-five years will be found in Appendix B.

The thanks of the Council have been tendered to the Auditors for their honorary services.

During the past year the Assistant Secretary, Mr. Kohan, has been entirely engaged on his military duties as First Lieutenant in the Royal Field Artillery Territorial Force, with the result that he has been unable to perform any of the duties of Assistant Secretary. The Junior Clerk, G. S. Smalley, also joined the Army in December last, and, as in the case of the Assistant Secretary, the Council ordered that he should receive his salary less the amount of his Army pay, and that his place should be kept open for him on his leaving the Army.

As the absence of these two members of the staff has considerably handicapped the work of the office, it was decided again to issue the *Journal* in four parts instead of monthly during the Session with a view to lightening the office and editorial work. For the same reason, the offices and Library have been closed at 5 p.m. instead of 7 p.m.

The Ordinary Meetings have been held monthly from January to May, 1916. There was no meeting in November owing to the death of the President, Lord Welby, and the December Meeting was not held owing to the Paper intended to be read on that occasion being unexpectedly delayed in its preparation. The holding of an ordinary meeting in June was also prevented owing to the illness of the Fellow who, it was hoped, would present the Paper for that meeting; in the short time available it was not found possible to make any other arrangements. The attendance at the meetings has been well up to the average, and the reading of the Papers has been followed by useful and interesting discussions.

Owing to Mr. Yule being engaged at the War Office and unable to devote the same amount of time to the *Journal* as during the earlier part of the Session 1914-15, the Council appealed for help in the editing of the July, 1915, *Journal*, and they desire to express their thanks to Dr. A. L. Bowley and to Mr. Sanger for their services in connection with the issue of that number. The Council regret the delay which has occurred in the issue of the several parts of the *Journal* this session, but feel sure that Fellows and subscribers will excuse it in view of the present circumstances. The depletion of the office staff and the pressing duties of the Honorary Secretaries in connection with the war have rendered the editorial work exceptionally difficult.

The Papers read before the Society during the Session 1915-16 have been as follows :—

1916.	
I.—January 18	de Jastrzebski, T. T. S. The Register of Belgian Refugees.
II.—February 15	Darwin, Leonard. Statistical Enquiries Needed after the War in connection with Eugenics.
III.—March 21	Paish, Sir George. War Finance.
IV.—April 18	Collet, Miss C. E. Cost of Food for an Adult Woman.
V.—April 18	Dunlop, Dr. J. C. Note as to Error of Statement of Ages of Young Children in a Census.
VI.—April 18	Dunlop, Dr. J. C. A Rapid Method of Calculating an Average Age.
VII.—May 16	Baines, Sir J. A., C.S.I. The Recent Trend of Population in England and Wales.
VIII.—May 16	Nixon, J. W., B.Sc. War and National Vital Statistics, with Special Reference to the Franco-Prussian War.

As will be seen, several of the communications, as was the case last Session, have had especial reference to the circumstances of the war. The cordial thanks of the Society are due to those who, by the reading of Papers, have maintained, at a high standard, the interest and value of the Society's Proceedings.

The additions to the Society's Library and the use made of it during the twelve months ending May 31, are shown in the statement given in Appendix C. The monthly average of books lent during the year ending May 31, 1916, was 108, and that of borrowers, 41. The total number of Fellows and others using the Library during the same period was 1,210, or an average of 101 persons per month.

It should be stated that the Society's Library is still being much used by various Government Departments in connection with questions of trade, exchange and population in relation to the war and the male populations of the different belligerent powers, and their distribution under present circumstances, the many foreign official and other publications contained therein and bearing on these subjects not being available elsewhere.

No award of the Howard Medal was made during the year 1915-16, and it has been decided that it shall not be offered for competition in the Session 1916-17. No award of the Guy Medal has been made.

The Council have taken out an insurance policy against damage from aircraft, and have also insured their stock of paper for the *Journal* stored with Messrs. Harrison and Sons, the Society's printers.

The following Fellows (nominated in accordance with By-law 14) are recommended for election as President, Council, and Officers of the Society for the Session 1916-17 :—

PRESIDENT.

Sir Bernard Mallet, K.C.B.

COUNCIL.

Thomas G. Ackland, F.I.A.
Percy Ashley, M.A.
Sir Henry Birchenough, K.C.M.G., M.A.
Edward Bond, M.A.
Sir Edward W. Brabrook, C.B., Dir.S.A.
John Brownlee, M.D., D.Sc.
*Professor Sydney J. Chapman, M.A.
Sir Timothy A. Coghlan, I.S.O.
Sir Richard F. Crawford, K.C.M.G.
Geoffrey Drage, M.A.
Reginald Dudfield, M.A., M.B.
Alfred W. Flux, M.A.
Major Greenwood, M.R.C.S.
William H. Hamer, M.D., F.R.C.P.
E. A. Hastings Jay, M.A., LL.B.
John M. Keynes, M.A.
*A. W. Waterlow King, J.P.
*Walter T. Layton, M.A.
Sir Theodore Morison, K.C.I.E., M.A.
Sir Shirley F. Murphy, F.R.C.S.
*Sir George Paish.
*George H. Pownall.
Sir R. Henry Rew, K.C.B.
E. C. Snow, M.A., D.Sc.
*J. C. Stamp, D.Sc.
T. H. C. Stevenson, M.D.
Sir Alfred W. Watson, F.I.A.
Sir James Wilson, K.C.S.I.
*Mrs. Frances Wood.
G. Udny Yule, M.A.

Those marked * are proposed as new Members of Council.

TREASURER.

Sir Richard Biddulph Martin, Bart. (*Hon. Vice-President*).

HONORARY SECRETARIES.

G. Udny Yule, M.A. A. W. Flux, M.A. T. H. C. Stevenson, M.D.

HONORARY FOREIGN SECRETARY.

Sir R. Henry Rew, K.C.B.

The abstract of the Treasurer's account of receipts and payments, and the estimate of assets and liabilities on December 31, 1915, together with the report of the Auditors on the accounts for the year 1915, are appended.

Signed on behalf of the Council,

George Hamilton,
President.
G. Udny Yule,
A. W. Flux,
T. H. C. Stevenson, } *Hon. Secretaries.*

C. M. Kohan,
Assistant Secretary.

APPENDICES TO ANNUAL REPORT.

A (i).—Abstract *of* Receipts *and* Payments *for the* Year *ended* December 31, 1915.

RECEIPTS.

	£	*s.*	*d.*	£	*s.*	*d.*
Balance in Bank, December 31, 1914	–	–	–			
Balance of Petty Cash	10	7	9½			
Balance of Postage Account	–	4	1½			
				10	11	11
Dividends on 2,236*l.* 11*s.* 3*d.* Consols, Account A	49	10	–			
Dividends on Consols, 10,527*l.* 12*s.* 3*d.*, Account B	233	–	10			
Dividend on 1,000*l.* G.N.R. Pref. Conv. Ord. Stock	36	–	10			
				318	11	8
Annual Subscriptions:—						
48 Arrears	100	16	–			
535 for the year 1915	1,123	9	–			
9 in Advance	18	18	–			
				1,243	3	–
592						
Compositions				63	–	–
"Journal" Sales				268	6	8
Advertisements in "Journal"				22	1	–
Royal Economic Society. Use of Library				10	–	–
Total				£1,935	14	3

PAYMENTS.

	£	*s.*	*d.*	£	*s.*	*d.*
Rent and Taxes:—						
Rent, less Tax	£348	6	8			
Taxes, 1914-15	50	13	4			
Total	399	–	–			
Less Sub-let	25	–	–			
				374	–	–
Fire, Light, and Water				51	–	7
Furniture and Repairs				47	13	3
Salaries, Wages and Pension				480	9	10
"Journal," Printing and Paper	£376	13	1			
,, Shorthand Reporting	32	3	4			
,, Literary Services	39	7	–			
				448	3	5
Ordinary Meeting Expenses	15	3	–			
Advertising	22	13	3			
Postage and delivery of "Journals"	33	9	6			
				71	5	9
Stationery and Sundry Printing	59	13	7			
Library	40	8	3			
Miscellaneous Expenses	70	4	11			
Medals	1	10	–			
				171	16	9
				1,644	9	7
Deficit repaid to Messrs. Drummond				158	7	3
				1,802	16	10
Balance at Bank, December 31, 1915	124	14	–			
Balance of Petty Cash	6	12	9			
,, Postage Account	1	10	8			
				132	17	5
Total				£1,935	14	3

(Signed) "Thomas G. Ackland,
"S. Chapman,
"J. C. Stamp,
Auditors.

"*February* 2, 1916."

A (ii).—ESTIMATE *of* ASSETS *and* LIABILITIES *on* DECEMBER 31, 1915.

LIABILITIES.	£	*s.*	*d.*	£	*s.*	*d.*	ASSETS.	£	*s.*	*d.*
Miscellaneous Accounts	120	3	9				Cash Balances	132	17	5
9 Subscriptions received in advance	18	18	–				2,236*l.* 11*s.* 3*d.* Consols (General Fund). (Price, December 31, 1915, 58½*l.*)	1,308	7	9
				139	1	9				
Balance in favour of the Society (Exclusive of (1) Books in the Library; (2) Journals in Stock; and (3) Pictures, Furniture and Fixtures)				8,230	11	5	10,527*l.* 12*s.* 3*d.* Consols (Guy Bequest). (Price, December 31, 1915, 58½*l.*)	6,158	13	0
							1,000*l.* G.N.R. Preferred Converted Ordinary Stock. (Price, December 31, 1915, 71½*l.*)	715	–	–
							Arrears of Subscriptions recoverable (say 25)	52	10	–
							Sundry debtors	2	5	–
				£8,369	13	2		£8,369	13	2

A (iii).—BUILDING FUND (ESTABLISHED *July* 10, 1873): STATEMENT *of the* FUND *on* DECEMBER 31, 1915.

This Fund is invested in Metropolitan Consolidated 3*l.* 10*s.* per Cent. Stock. On December 31, 1914, the Fund was represented by 582*l.* 10*s.* 3*d.* of that Stock. With the dividends received during 1915, additional Stock to the value of 18*l.* 19*s.* 11*d.* was purchased by the Bank of England for the Society. Accordingly, on December 31, 1915, the total investment amounted to 601*l.* 10*s.* 2*d.* Stock.

(Signed) "THOMAS G. ACKLAND,
"S. CHAPMAN,
"J. C. STAMP,
Auditors.

"*February* 2, 1916."

A (iv).—"REPORT OF THE AUDITORS FOR 1915.

"*The Auditors appointed to examine the Treasurer's Accounts for the Year* 1915,

"REPORT:—

"*That they have compared the Entries in the Books with the several Vouchers for the same, from January* 1 *to December* 31, 1915, *and find them correct, showing the* RECEIPTS (*including a Balance of* 10*l.* 11*s.* 11*d. from* 1914) *to have been* 1,935*l.* 14*s.* 3*d., and the* PAYMENTS 1,802*l.* 16*s.* 10*d., including the repayment of the deficit of* 158*l.* 7*s.* 3*d. due to Messrs. Drummond at the end of* 1914, *leaving a balance in favour of the Society of* 132*l.* 17*s.* 5*d. on December* 31, 1915.

"*They have also had before them an Estimate of the Assets and Liabilities of the Society at the same date, the* FORMER *amounting to* 8,369*l.* 13*s.* 2*d., and the* LATTER *to* 139*l.* 1*s.* 9*d., leaving an excess of Assets over Liabilities of* 8,230*l.* 11*s.* 5*d.,* EXCLUSIVE *of* (1) *Books in Library;* (2) *Journals, &c., in Stock; and* (3) *Pictures, Furniture, and Fixtures.*

"*They have* VERIFIED *the investments of the Society's General Funds* (2,236*l.* 11*s.* 3*d. Consols and* 1,000*l. G.N.R. Stock*)*; the Guy Bequest* (10,527*l.* 12*s.* 3*d. Consols*)*; the Building Fund* (601*l.* 10*s.* 2*d. Met. Cons. Three and a half per cent. Stock*)*, and also the Bankers' balance* (124*l.* 14*s.*)*; all of which were examined and found correct. The market prices at December* 31, 1915, *have been adopted.*

"*They further find that at the end of the year* 1914 *the number of* FELLOWS *on the list was* 821, *which number was reduced in the course of the year to the extent of* 61, *by Death, Resignation, or Default; and that* 12 *new Fellows were elected or restored to the list, leaving on the list on December* 31, 1915, 772 *Fellows of the Society, of whom* 163 *were compounders.*

(Signed) "THOMAS G. ACKLAND,
"S. CHAPMAN,
"J. C. STAMP, } *Auditors.*

"*February* 2, 1916."

B.—*Statement of the Condition of the Society in the last Twenty-five Years* 1891-1915.

Year.	Number of Fellows on December 31.	Number of Life Fellows included therein.	Losses during Year by Deaths, &c.	Gains by Election, &c., during Year.	Income from					Expenditure.			Amount Invested on December 31.	Year.
					Annual Subscriptions.	Compositions.	Journal Sales.	Investments and other Sources.	All Sources.	Total.	Of which			
											On Journal.	On Library.		
					£	£	£	£	£	£	£	£	£	
1891	1,019	172	80	36	1,707	42	146	181	2,076[g]	1,957[h]	582	172	2,900	1891
'92	994	171	70	45	1,634	84	158	104	1,980	1,883[i]	539	94	2,900	'92
'93	964	176	66	36	1,560	124	128	92	1,904	1,921	578	63	2,900	'93
'94	933	180	67	36	1,491	105	152	82	1,830	1,904	649	75	2,900	'94
'95	928	180	59	54	1,468	63	180	82	1,793	1,823[j]	576	56	2,900	'95
'96	910	181	48	30	1,478	42	168	84	1,772	1,787	571	44	2,900	'96
'97	892	182	58	40	1,472	145	157	83	1,857	1,986[k]	650	50	2,900	'97
'98	878	180	57	43	1,451	115	182	105	1,853	1,825	609	55	3,300[l]	'98
'99	896	181	44	62	1,432	95	167	127	1,821	1,805	564	33	3,300	'99
1900	923	179	36	63	1,514	21	189	148	1,872	1,817	521	53	3,300	1900
'01	926	177	49	52	1,464	63	211	129	1,867	1,823	518	42	3,300	'01
'02	932	177	52	58	1,504	21	255	152	1,932	1,839	513	73	3,300	'02
'03	939	174	49	56	1,517	84	293	151	2,045	1,875	593	91	3,300	'03
'04	925	175	58	44	1,407	124	253	152	1,936	1,931[a]	521	92	3,400	'04
'05	911	178	59	45	1,465	168	220	220	2,073	2,074[m]	665	67	11,975[n]	'05
'06	891	177	63	43	1,464	82	225	408	2,274[o]	1,988	645	95	11,449	'06
'07	861	172	63	33	1,363	82	327[q]	408	2,180	2,401[p]	571	87	11,746	'07
'08	855	170	46	40	1,339	84	254	494[r]	2,171[r]	2,428[s]	602	92	11,920	'08
'09	825	167	82	52	1,307	84	273	396	2,060	2,369	641	99	12,084	'09
1910	845	172	37	57	1,304	141	326	974[t]	2,746[t]	2,726[u]	803	74	11,210	1910
'11	867	174	40	62	1,415	126	308	405	2,255	2,372[v]	721	104	10,875	'11
'12	854	175	57	44	1,336	105	334	382	2,157	2,174	776	81	10,599	'12
'13	846	174	61	53	1,331	84	294	399	2,108	2,058	671	79	10,092	'13
'14	821	169	64	39	1,281	42	271	489[y]	2,083	2,319[x]	813	88	9,528	'14
'15	772	163	61	12	1,243	63	268	351	1,925	1,803	448	40	8,182	'15

[a] Includes purchase of Government stock.
[g] Includes Mrs. Lovegrove's legacy of 100*l*.
[h] Includes outlay for Guy Medal and for binding "The Times."
[i] Includes outlay for drainage repairs.
[j] Includes cost of Subject-Index to *Journal*.
[k] Includes cost of doing up interior of premises.
[l] Includes 400*l*. G.N.R. Stock, purchased with Mr. J. Heywood's Legacy of 500*l*.
[m] Includes 100*l*. to International Statistical Congress Fund.
[n] Includes the Guy Bequest. The total invested is now valued at current prices.
[o] Including 126*l*. for sale of books.
[p] Includes purchase of 600*l*. G.N.R. Stock.
[q] Includes special sales.
[r] Includes Sanford Bequest, 100*l*.
[s] Includes 160*l*. for Catalogue and 288*l*. for purchase of Stock.
[t] Includes 500*l*. from sale of Consols and 68*l*. Income-Tax refunded.
[u] Includes 436*l*. for re-decoration of premises, installing electric light and furniture.
[v] Includes 169*l*. for furniture and carpets and "at home" expenses.
[x] Includes 100*l*. to International Statistical Institute.
[y] Includes 100*l*. raised by sale of 134*l*. 14*s*. 9*d*. Consols for the purpose of note x.

C.—*Estimated Numbers of Books Added to the Library and Lent, and Numbers of Borrowers from the Library in the Sessional Years* 1913-14, 1914-15, *and* 1915-16.

Months.	Works Received.*			Books Lent.						Borrowers.			Fellows and Visitors using the Library.					Months.
	1913-14.	1914-15.	1915-16.	1913-14.		1914-15.		1915-16.		1913-14.	1914-15.	1915-16.	1913-14.	1914-15.	1915-16.	Called after 5 p.m. or remained after 5 p.m.		
				Works.	Vols.	Works.	Vols.	Works.	Vols.							1914-15.	1915-16.	
1915.																		1915.
July	740	700	582	58	75	85	102	48	86	37	50	33	134	81	83	—	—	July
August	—	—	—	17	17	24	29	40	71	11	19	22	67	56	58	—	—	August
September	—	—	—	42	64	32	41	32	50	27	25	22	109	112	67	—	—	Sept.
October....	—	—	—	62	76	33	39	83	134	50	25	40	148	102	91	8	—	October
November	—	—	—	30	38	40	49	68	78	26	28	37	108	92	104	6	—	Nov.
December	311	—	—	81	99	55	65	66	101	49	32	46	99	89	88	3	—	Dec.
1916.																		1916.
January	97	197	228	60	72	39	48	76	139	48	22	44	116	71	125	1	—	January
February	67	—	—	53	60	80	91	66	81	33	53	34	106	83	104	6	—	February
March	73	89	88	49	74	55	74	97	130	42	36	60	107	124	128	6	—	March
April........	71	—	—	57	64	53	63	71	127	38	35	42	74	119	103	15	—	April
May	85	109	115	51	77	39	64	116	211	34	29	64	96	124	132	9	—	May
June	55	—	—	78	87	61	89	—	—	44	43	—	93	127	—	4	—	June
Sessional year....	1,500	1,095	1,013	638	803	596	754	824	1,297	439	397	487	1,251	1,180	1,210	—	—	Sessional year
Monthly average	125	91	84	53	66	50	63	69	108	36	33	41	104	99	101	—	—	Monthly average

* These figures represent the number of works entered during the year, under "Additions to the Library," in the *Journal*, and not the number of separate volumes; they are exclusive of about 150 weekly, monthly, and quarterly periodicals regularly received.

PROCEEDINGS *at the* EIGHTY-SECOND ANNUAL GENERAL MEETING, held on Tuesday, June 20, 1916.

The President, the Right Hon. Lord GEORGE HAMILTON, G.C.S.I., in the Chair.

THE circular convening the meeting was read.

The CHAIRMAN in moving the adoption of the Report, remarked that, considering the circumstances, the Report was not unsatisfactory. As was to be expected the numbers of Fellows had been somewhat reduced, owing to the war, and they had to record with deep regret the death of their President, Lord Welby. On the invitation of the Council, he had undertaken to discharge for the remainder of the Session the duties of President, and congratulated the Society on the prospect of securing as their new President, Sir Bernard Mallet, K.C.B., the Registrar-General. The Chairman referred briefly to the financial position of the Society and to the needs of an increased membership and moved:—"That the Report of the Council, the "Abstract of Receipts and Payments, the Estimate of Assets and "Liabilities, and the Report of the Auditors be adopted, entered on "the Minutes, and printed in the *Journal*."

Sir EDWARD BRABROOK in seconding the motion expressed the appreciation by the Society of Lord George Hamilton's services in accepting the Presidency for the remainder of the Session and contributing by his labours to its success.

The motion was carried unanimously.

The Ballot for the election of the President, Council and Honorary Officers for the Session 1916-17, was then taken, and the Scrutineers (Mr. F. W. BARTLETT and Mr. SIDNEY YOUNG) reported that they had been unanimously elected.

The HON. SECRETARY having read the list of defaulters, the President declared that they had ceased to be Fellows of the Society.

Mr. G. H. POWNALL in moving a cordial vote of thanks to the President, Council, and Officers, for their services during the past year, drew attention to the importance of the statistical treatment of the many questions that had arisen in connection with the present activities of the nation, and of the consequent arduous calls upon the President, Council, and the Honorary Officers of the Society in connection with its proceedings.

Mr. SIDNEY YOUNG seconded the Vote of Thanks, which was carried unanimously.

Sir ERNEST CLARKE called attention to the inclusion in the list of Honours conferred on the occasion of the King's Birthday, of the names of three members of the Council of the Society, namely, Sir Bernard Mallet, Sir Henry Birchenough and Sir R. Henry Rew. This he thought was a matter for congratulation to the Society and worthy of special record in the Minutes.

The CHAIRMAN concurred in this suggestion and the meeting then adjourned.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

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1.—*The Mathematical Theory of Probabilities and Its Application to Frequency Curves and Statistical Methods.* By Arne Fisher, F.S.S. Translated and edited from the Author's original Danish notes, with the assistance of William Bonynge, B.A. Volume I. *Mathematical Probabilities and Homograde Statistics.* xx + 171 pp., 8vo. New York: The Macmillan Co., 1915. Price 8*s.* 6*d.* net.

Mr. Arne Fisher's object in preparing the treatise of which the first volume lies before us was to place in the hands of students a textbook of mathematical statistics which should include an account of researches published in several European languages, and not fully described in English works, as well as an estimate of the contributions made to statistical science by English and American authors. The present volume contains a discussion of some of the simpler problems in what may be called classical probability with applications of the results to homograde statistics or what we more usually term statistics of attributes.

The first five chapters follow well-worn lines and do not call for special comment. In the sixth the author examines Bayes' theorem and its applications, a discussion which is fuller than any to be found in current textbooks but by no means exhaustive. Mr. Fisher need not have devoted a page and a half to a criticism of the phrase "inverse probability"; nobody capable of understanding Bayes' investigation is at all likely to be misled by the term any more than was De Morgan himself. Upon the whole we agree with Mr. Fisher's conclusions respecting the theorem, but we should need much space to define our exact measure of agreement. We may, however, remark that the real value of Bayes' principle seems to us to reside in its application to the study of consistency, that is to say to the problem of determining whether two or more samples can properly be regarded as having been derived from one and the same "universe." This aspect of the matter has not engaged Mr. Fisher's attention.

In Chapters seven to nine, Mr. Fisher considers the so-called Law of Large Numbers and various well-known consequences; novelties, so far as English textbooks are concerned, being the use of the method of mathematical expectation in proving the fundamental theorems and the introduction of certain results due to Tchebycheff. Both these novelties are welcome; we agree with the comments of Dr. Anderson, of Petrograd, in a recent issue of *Biometrika*, as to the neglect of mathematical expectation by most English statisticians, while Tchebycheff's work, although familiar to readers of Czuber's textbook, cannot be too well known.

The remainder of the volume is devoted to measures of dispersion and practical illustrations. It is this section which is, in our opinion, most open to criticism, although some of our objections to it may be removed in the second volume. It is, however, worth while to record our reasons for dissenting from some of Mr. Fisher's conclusions.

While admitting that English statisticians are not catholic in their sympathies, we do not think their neglect of the criteria of Lexis and Charlier at all blameworthy because, in our opinion, these criteria are of small practical importance. A given example of the statistics of attributes or, if Mr. Fisher prefers the term, homograde statistics, may exhibit a standard deviation equal to, less than or greater than the standard deviation of type $\sqrt{n\,p\,q}$. A comparison of this observed standard deviation with the type form, due regard being paid to the dispersion of the standard deviation itself, gives all the information we can obtain without calculating higher moments and the computation of the coefficients of Lexis or Charlier seems to us a work of supererogation. Further, Mr. Fisher's insistence on these criteria may tempt the unwary to suppose that the three schemata, the Bernoulli, Poisson and Lexis series, are an exhaustive enumeration of the "universes" giving rise to various dispersions. As a matter of fact, divergences of the dispersion from the type $\sqrt{n\,p\,q}$ can all be resumed under the form $\sqrt{\{n\,p\,q\,[1 + r\,(n-1)]\}}$, of which the three series are particular cases. In an introductory note Mr. Frankland claims for Mr. Fisher's book a wider scope than that of Mr. Yule's *Introduction*, while Mr. Fisher himself complains that Mr. Yule "apparently ignores" the criteria of Lexis and Charlier (the truth is that Mr. Yule cites both these authors). Anyone, however, who compares the masterly handling of the problem in Mr. Yule's thirteenth and fourteenth chapters with Mr. Fisher's discussion will have no doubt that the method adopted by Mr. Yule is not only more economical in its use of symbols but far more general than the

Procrustean efforts of the continental authors, as expounded by Mr. Fisher, to reduce everything to one of three "*Urnenschemata.*" A very instructive comparison can be drawn between the illustration from the statistics of coal mining accidents discussed on p. 156 of Mr. Fisher's book and Mr. Yule's treatment of precisely similar statistics (Yule *op. cit.* p. 288).

Passing to minor points, we think the wording of par. 66 on p. 106 is unhappy. The mean error of the sum of two observed variables only takes the form given—as is implicit in the proof—if the variables are strictly independent. The statement in the preface that the English schools have mostly limited their investigations to the field of biology is rather misleading. Mr. Fisher modestly apologises for errors of style or grammar and most of us would be very glad to be able to write Danish as well as he writes English ; still the linguistic revision might have been carried a shade further with advantage. We hope the chevalier de Méré was only a *habitual* not a *professional* gamester (in which case, by the way, he would not have been so interested in pure chance), and we are surprised to learn that amateur statisticians have a tendency "to poke upon the law of large "numbers." *D'Alembert* appears throughout as *D'Alambert.*

These remarks are not to be taken as implying that Mr. Fisher's book is other than a useful contribution to our literature, and we shall look forward with pleasure to the appearance of the second volume. M.G.

2.—*The Declining Birth-rate, its Causes and Effects* (being the Report of and the chief evidence taken by the National Birth-Rate Commission, instituted with official recognition, by the National Council of Public Morals—for the purpose of Race Regeneration—Spiritual, Moral and Physical). xiv. + 450 pp., 8vo. London : Chapman and Hall, Ltd., 1916. Price 10*s.* 6*d.* net.

Everyone will agree that the highly complicated questions involved in a steadily declining birth-rate stand in the first rank of contemporary problems and can only be elucidated by the co-ordination of the results of investigation by competent specialists. The qualifications for such a task are undeniably to be found amongst the members of the Commission whose Report is before us. Vital statistics, upon which the inquiry must be based, may be considered safe, if anywhere, in the hands of Doctors Newsholme, Stevenson and Greenwood. The medical profession, of both sexes, was, from the nature of the case, strongly recruited as to number and also eminence. The religious and moral aspects of the main question involved were under the watchful eye of dignitaries of the Churches of England and Rome, sitting side by side with a distinguished Rabbi, the wife of the General of the Salvation Army, and several well-known representatives of the Free Churches. Nor were economists and those interested in social work, as it is now understood, omitted. Considering that "Commissionitis" is, as it were, endemic in the House of Commons, it is worthy of note that only one Hon. Member is included, but he is a Right Hon.

A leading feature in the volume is the evidence of the twenty-five experts called before the Commission, which contains a mine of most interesting and valuable information. To begin with statistics, Dr. Stevenson gives an excellent survey of the birth and marriage-rates for England and Wales, supplemented by a considerable instalment of the information regarding marriage and fertility secured at the last census for the first time, and which will form one of the most prominent features in the forthcoming General Report. Dr. Dunlop summarized the results of his special investigations into the same subject at the Scottish census, with most of which he has made us familiar in papers read before this Society. The contribution of Dr. Greenwood is chiefly devoted to the analysis of some small collections of figures relating to the matrimonial tendencies and practice of women students at the Universities and Fabians of that sex. Some evidence bearing upon the same topic was also given by the representative of eugenics in the United States, where the field of inquiry has been more extended of late years. The voluminous medical evidence covers the wide area of the prevalence of the practice of limiting the family and the various means adopted for this purpose, together with professional opinions as to the physiological effects of such devices in their different forms. Nor, of course, was the grave question neglected of the relation of venereal disease to the conception and survival of infants. From Scotland was adduced testimony in favour of a cyclical decline in fertility in explanation of the present situation, a view controverted by Dr. Stevenson. The influence of housing-difficulties upon marriage and fertility was evidently much in the mind of the Commission, but the evidence directly bearing upon it related to London only, though some of the social workers testified to the extent of the problem in other towns and districts. Towards the end of the volume are found the authoritative contributions of the Bishop of Southwark, Monsignor Brown and the Chief Rabbi, who set forth the attitude of their respective creeds towards the artificial limitation of offspring. On the other side of the question, and in the forefront of the evidence, comes the conventional attack upon a high birth-rate, delivered at some length by the Secretary to the Malthusian League, followed by a still more lengthy catechism at the hands of the Commission, which may perhaps have suggested to the witness, as he withdrew, the classical reflection made by the parrot upon his protracted tête-à-tête with the monkey.

The Report deals with the main question under the heads of Statistics, Medical aspects, Economic and Social aspects, Moral and Religious aspects, and Housing. It should be borne in mind in regard to it, that the function of the Commission, according to an apparently authoritative newspaper forecast quoted in the Preface, was to inquire into the extent and character of the decline, its alleged causes and its effects upon children, parents and home life. They were also to consider the economical and national aspects of an increasing and a declining population respectively. It will be seen, therefore, that the object in view was to secure information rather than to suggest measures, so that definite recommendations on the questions dealt with are not to be expected, indeed, one only is formulated, viz., the extension of the provisions of the Poisons Acts to the various chemicals stated before them to be in comparatively wide use in inducing abortion.

The statistical section is the most voluminous, and occupies more than half the Report. It lends itself, too, to more precise conclusions than the other branches of the investigation. The propositions which the Commission hold to be "definitely "established" are all accepted already by students of our vital statistics. The Commission devote, also, some consideration to the theory of a cyclical decline in fertility, but—without expressing a definite opinion—prefer, on the whole, another explanation of the facts. The aforesaid five propositions are followed by two "sufficiently well established," though based on evidence less substantial than their predecessors. The first of these, relating to the prevalence of conscious limitation of fertility, rests, in fact, upon evidence other than statistical. The second counters an allegation that high education tends to lower fertility, and is based upon the facts collected in some special inquiries from a relatively small number, and that of women only, and expresses the conviction that women of Fabian and University training can, but won't, have large families.

In the housing question the Report finds a more widely spread factor in the situation than higher education amongst women, and the Commission set forth some valuable details as to the conditions in London, and are much impressed also with the importance of the matter elsewhere; but the facts in regard to rural conditions seem to require the corroboration of more unbiassed investigators than those cited in the Report. The Commission find that it is admitted by all that the lower paid workers cannot afford the commercial rent for adequate accommodation. One authority quoted by them states that wages must be raised before the worker can be benefited by State-aided building. Another, however, enlarges upon the great benefit which has been derived from the statutory promotion of cottage-building in parts of Ireland. Between these two the Commission decline to arbitrate, but express their opinion that the housing question makes the rearing of large families very difficult for the worker, and also affects the birth-rate.

In treating of the conscious limitation of the family from the standpoint of religion, the Report merely summarizes the almost unanimous opinion of the clerical witnesses and gives none of its own. On the moral side, the appeal is made to "deep seated racial "instincts," and this is perhaps as far as the Commission were called upon to go, though in the next paragraph they shrewdly point out the consequences of a widespread knowledge of these means of limitation amongst the unmarried. As to the physical results of these practices, medical opinion is stated to be as yet immature.

The economic and social aspects of the subject, though they loomed large in the forecast, are dealt with succinctly in the Report.

Only Dr. Saleeby and Mr. J. A. Hobson helped the Commission with evidence, and the latter had, therefore, to spin their own cocoon, as it were. Fortunately, there is little left for them to say about the population question in its wider aspects. The Report leans gently on the side of an increasing population, accompanied by a wise distribution of State burdens, which must not tend to stimulate the present differential fertility. Various social-economic changes are mentioned which have been proposed in order to increase the birth-rate by improving the conditions of the masses, but to these the Commission append the statistically proved tendency of the birth-rate to fall as the resources rise.

It may fairly be inferred from what followed that this somewhat Laodicean attitude, though not, perchance, out of harmony with the original objects of the inquiry, was confined to the Chairman and Secretary with one or two others. For all the signatories of the Report with those exceptions, and with one who did not sign the Report, present a long "Addition" to that document, in which they argue in favour of an increasing population as far as is consistent with a rising standard of life. To promote the attainment and maintenance of this standard, they suggest various changes in not only social and economic conditions, but in public opinion and custom, admitting that all of them will not meet with unanimous approval. They won't. Nevertheless, the whole paper reflects a good deal of reasonable and patriotic popular sentiment, and forms a not unwelcome supplement to the solid groundwork of the evidence, and the orthodox but somewhat "fusionless" comments thereon of the main Report. J.A.B.

3.—*Population : A Study in Malthusianism.* By Warren S. Thompson, Ph.D. 216 pp., 8vo. New York : Columbia University and P. S. King and Son, London, 1915. Price 7*s.* net.

Not in the case of poets only but in that of many less imaginative authors it would often be flagrantly unjust if their position in the world of letters were to be settled once for all on the merits of their earliest work alone. This, however, in the realm of social science, has been the lot of Malthus, and it was not until within a comparatively recent period that the later and matured statement of his theory of population was not obscured in the public eye by the sweeping generalizations and dismal outlook of his first edition. In the study now before us Malthus comes into his own. It is true that the circumstances upon which his theory was based have given place to others widely differing from any he could have studied or have had any grounds for anticipating. Modern science had not influenced transport and communication and had only just begun to affect manufacturing industry. Each country was considered by him as an independent unit in regard to the means of subsistence, and the production of staple foods was then held to depend upon extension only, as intensive methods were in their infancy. Nevertheless, the changes which have taken place since he wrote have not upset the stability of his main position, as here set forth by Dr. Thompson :—

> "Although at any normal time there is food enough to keep alive "all members of the population, yet it is only actual pressure upon "subsistence (operating in certain portions of the population), or "fear of pressure (which assumes manifold forms), which keeps a "population from multiplying more rapidly than it actually does" (p. 14).

These are not the words of Malthus, but a fair condensation of them, and the qualifications introduced are taken from the general lines of his argument rather than from any concrete statement in his Essay. The three general propositions which Malthus set himself to prove are also quoted in the beginning of the volume, and the general conclusion reached by Dr. Thompson is that they are substantially borne out by the course of events in the century following their first publication, on the evidence of statistics wider in scope and incomparably more accurate than those to which Malthus had access.

After briefly stating, without discussion, the views held by some distinguished economists of our day upon the relation between population and the production of the means of subsistence, the author proceeds to the numerical aspect of the subject, as contained in the statistics of wages and prices, of production of staple foods and the interchange of foodstuffs between communities, together with those bearing upon the return to agricultural and manufacturing industries respectively, and, on the other side of the question, the movement of population since the days of Malthus in the countries of Western Europe and America. Official returns on production and distribution though vastly improved, as stated above, since Malthus' time, have still to be handled with great caution, and owing to want of uniformity in their preparation, cannot safely be taken at their face-value in international comparison. Instances in point occur in this work, but, on the whole, the author exercises commendable discrimination in the relative value he attaches to his material. His investigations have led him to conclude that in regard to wages and prices there has been a tendency of late years for the cost of food and other necessaries to increase more rapidly than "real" wages, in the States, Germany and this country, but not in France. The purchasing power of wages, that is, is tending to diminish. The great increase, again, in the production of food in the older and in parts of the more recently developed countries of the civilized world is beginning to be counterbalanced to some extent by a diminution in the return relative to the labour expended upon it, and he finds some reason to think that a similar tendency can be traced in manufacturing industry also. The same trend of circumstances is likely, he surmises, to occur in the tracts still available for the support, for a more or less prolonged period, of an increasing population in the temperate zones. Here population goes on increasing, as Malthus states, with an increased supply of the means of subsistence, though the rate of growth is checked, as, again, he suggested it would be. The population tends to become more industrial than agricultural, more urban than rural, more dependent upon others for its supplies than on its own production; in effect, more crowded, with an increasingly complicated standard of living and keener struggles to attain or maintain it. The one outstanding exception to the first proposition of Malthus—that population tends to increase when food increases—is France, but that country establishes most firmly the soundness of his all-important qualification "unless prevented by some very powerful "or obvious checks." Here it is the preventive check, or the modern equivalent of what he termed "moral restraint," the abstinence, not from marriage, which he had in mind, but from breeding, which he considered to be the inevitable consequence of marriage. France, therefore, so far from refuting his theory, stands in with the other countries as an example of its truth. Not, however, that the example of our neighbour and ally is one to be recommended for general adoption, unless each country could be constituted an inviolable sanctuary, immune from the peaceful penetration of the lower standards of life prevailing in less prosperous communities or the aggressive ambition of neighbours more prolific. That defence is more than opulence is a lesson now being driven in throughout the western world. Dr. Thompson is not without the hope that the balance between the two can be kept even, not by the re-distribution of resources, an expedient which can be of no more than temporary influence, but by a simplification of the standard of living, such as would help to place it within the reach of more of those whom the increase of population may be driving below it. This is here put baldly, and should be considered in the light of the author's own exposition. There is no doubt that where a higher proportion of the population is diverted from manufacture to food production, the tendency of the average standard of living will be downwards, not in efficiency, but in the number of things conventionally held to be necessaries under the existing conditions.

There is this also to be borne in mind, and it is perhaps given too little prominence in this forecast, that just as production is now being promoted by expedients undreamed of in the time of Malthus, so now it would be highly presumptuous on our part to assume that in these matters we have extracted from science its last word, and that posterity is not likely to profit by discoveries of which we have not the smallest conception. J.A.B.

4.—*Second Thoughts of an Economist.* By William Smart, D.Phil., LL.D., with a Biographical Sketch by Thomas Jones, M.A. lxxxix + 189 pp., 8vo. London: Macmillan and Co., 1916. Price 5*s*. net.

The numerous admirers of the Glasgow Professor, whose death a little more than a year ago was felt as a personal bereavement by many economists, will, we are sure, be glad to possess this memorial of his attractive character and happy honourable career. An excellent photograph forms a suitable frontispiece; and it is followed by Mr. Jones' skilful biographical sketch. In that the appreciative loyalty of an affectionate pupil has been deftly united with the independent judgment of a capable informed exponent of the subjects Smart himself studied and taught to produce a living portrait. The picture indeed, spoiled neither by excessive praise nor by grudging approbation, seems to us exactly true; and it reveals the lovable disposition of an uncommon man. No one, indeed, if we may judge, was more honestly conscious of defects, or more openly modest in his pretensions; and the first occupant of the Adam Smith chair, newly founded in the great Scotch University, would probably have disowned a place on the roll of famed economists as high as the unique position given to the author of the *Wealth of Nations*. Yet he might, we believe, have justifiably claimed no small measure of that rare originality of statement which even the audacious stigmatizers of the father of modern economics as a borrower of the ideas of others have not had the effrontery to deny to their rejected idol. On this account alone Smart's writing seized and held the interested attention of the ordinary citizen, and the volume now before us is characterized by this arresting quality. Mr. Jones is not exaggerating when, employing the superlative degree of eulogy, he asserts that his revered and stimulating teacher could be held responsible for no sentence passed for printing which was not at once intelligible to plain men. How few economists, in these modern days of subtle and refined technicalities, could meet satisfactorily this test?

The early discipleship of Ruskin, surviving the grave shock given to that æsthetic moralist when he learnt that an ardent follower was joining the degrading company of abhorred economists, left also a permanent impression on Smart's mind and work. That was shown, not merely in an agreeable fondness for the welcome accessories of comely print and good composition, but also in the mode of conceiving, and the method of elaborating, abstract argument that might otherwise have seemed arid or repugnant. If to this we add the great benefit of close familiarity with the actual concrete detail of manufacture and of trade, we discover ample compensation, if that be needed, for the limited acquaintance with general economic literature which was evident in Smart's earlier essays. In those useful translations, for example, of the Austrian economists that first made him known to economic students the similar independent contribution of the English Jevons was at the outset, so it seemed, unfamiliar. Nor would it be unjust to affirm the survival of this attitude in some passages of his latest book, posthumously published. If we do not misinterpret, Smart occasionally puts forward, with an engaging air of naïve surprise, pronouncements he apparently regards as novelties. And yet others might, in some instances at any rate, we suspect, recognize old truths discerned and proclaimed long before. The dress alone they would acknowledge to be new.

Criticism, however, of these "Second Thoughts" is not congenial to the present circumstances, and it may easily be mistaken or unjust. We hasten therefore to observe that they reveal felicitously the high qualities of their utterer. The genuine intensity of Smart's ardent zeal for economics, shown perhaps most strikingly in the closing period of his busy authorship, is evident on every page. That religious fervour was exhibited in the patient industry that prompted him, after researches for the Poor Law Commission, deservedly commended by the Chairman, Lord George Hamilton, to face the ungrateful drudgery and enormous toil involved in the preparation of his "Economic Annals of the Nineteenth Century," when life was already well advanced. As we read the successive chapters of this brief unfinished essay we feel convinced of the transparent honesty of Smart's emphatic declaration that the career of a professor, enjoying a modest competence, was the most desirable of callings that a man of reasonable tastes could hope or wish to pursue. And, as no man valued more highly the privileges, so no man was more alive to the responsibilities, of the position.

Looking out, therefore, from the quiet haven of academical security on the restless storm-swept sea of industrial activities, amid the environment set by the conditions of a country organized like that of the United Kingdom in the twentieth century, Smart was acutely conscious that all was not right. Too many workers seemed fated to be denied by the circumstances of their daily toil the opportunity for the fuller life that they should rightly command in a constitution of affairs arranged more perfectly. He held in consequence, and he enforced, the wholesome doctrine that by awakening consumers to sequels of their acts, which they had hitherto neglected to observe, and by encouraging the more complete discharge by employers of their continuing responsibility to their employees in the shape of such promising programmes as plans for "welfare "work," a needed amelioration might and should be wrought.

But, with this enlightened sympathy, and this reforming ardour, begetting, or begotten by, his "Second Thoughts," he refused to combine the irrational wholesale censure of the existing economic order which proceeded from Socialistic critics, and he was not inclined to commend or advocate that extension of the authority of governments which they affirmed to be the indispensable effective remedy. On the contrary, as he insists, he was and remained an "economist." He trusted, perhaps too implicitly, to the re-establishment of the economic harmony, postulated by the earlier writers, through the adjustment, becoming continually more adequate in the conditions of the present day, of reward to worth. And, in a similar spirit and belief, he found the explanation of the difficulties which had arisen and interfered with the realization of this ideal. A vast growth of wealth, due to immense improvement in the business of production, had been followed by the large addition to population which it alone permitted. The simultaneous development, never likely perhaps to reach satiety, of human appetite could not have gained the gratification it had secured, had not men been enabled to achieve the more complete subjugation of nature which distinguished the advanced modern from the backward earlier world. The Industrial Revolution was the turning point, and in his opinion it had brought a decisive balance of advantage, if an economist, living amid its results, mostly good but partly bad, was perplexed by "second "thoughts." Such, summarily stated, is the theme of this interesting book. L.L.P.

5.—*Corso di Scienza della Finanza.* By Professor Luigi Einaudi. Third Edition. xvi + 594 pp., 8vo. Turin: *La Riforma Sociale*, 1916. Price 15 lire.

This work is based on courses of lectures delivered by Professor Einaudi during several years at the University of Turin and the Bocconi Commercial University, Milan. The two former editions were edited by pupils of the author, but the present edition has been completely revised and largely recast by the author himself, and bears the character not of a mere collection of lectures but of a systematic treatise. It may be said at once that the book is admirably suited for University students commencing the study of public finance, as the exposition is orderly, lucid and arresting, while in many respects the treatment of the subject will be found suggestive by more mature readers.

The main subject of the work is the raising of the public revenue, questions relating to public expenditure being touched on only incidentally in order to explain the purpose and need of revenue. In an Introduction of twenty pages there is a brief discussion of the nature of public finance and its relation to political economy and kindred sciences, followed by a classification of public needs and the appropriate means of satisfying them. Professor Einaudi adopts (with slight modification) Professor Seligman's classification of public revenues into (1) quasi-private prices, where the State undertakes commercial enterprises for the double purpose of satisfying a private demand and at the same time safeguarding some public interest, (2) public prices, where State monopolies are carried on for the purpose (in the particular instances considered to be beneficial to the State) of supplying a private demand at cost price, (3) fees, where services are rendered by the State to private individuals at less than cost price, the balance being defrayed out of general taxation, (4) special assessments, which are generally levied by local authorities on individuals who are presumed to derive a special advantage from public works undertaken in the general interest, and (5) taxes, which are, as it were, a residuum and are levied on the members of the community, not as payment or part-payment for services rendered to them individually, but to defray all those public expenses which cannot be charged, or which the State does not consider it desirable to charge, to the account of individual beneficiaries. Following the Introduction, the main body of the treatise is divided into three books. The first four of the above classes are treated as quasi-private receipts and are grouped together in Book I (pp. 21–131); Book II (pp. 135–281) deals with the principles of taxation; and Book III (pp. 283–567) contains a critical exposition of the Italian system of taxation in the light of the principles enunciated in Book II. The second edition contained a fourth book on "Extraordinary "Finance," but this book disappears from the present edition, its substance being contained in a separate work recently published under the title *La finanza della guerra e delle opere pubbliche*, which deals with extraordinary State expenditure and receipts and particularly with the problems of State loans and the public debt.

The purpose of Book I is not merely to explain and illustrate the methods of raising revenue dealt with therein, but to indicate the stages by which one travels from private economy, which is governed by market conditions, to public economy, or the financial relationship between the State and the general body of its members, which is governed by Law. From this point of view the classification is useful, but it is far from perfect, as Professor Einaudi admits, and in many respects it merits the criticism to which it has been subjected by Professor Bastable. Quasi-private prices, public prices and fees overlap to such a great extent that it is difficult to maintain a clear distinction between them, while many charges in the form of fees are really taxes. The classification is further complicated by the fact that the revenue from a legally protected State monopoly that yields a profit is regarded as a tax, while the profit from a natural monopoly or a non-monopolistic State enterprise is a price. Indeed, different branches of the same public undertaking may fall under the headings of private price, public price, fee and tax. The chief fault of the classification is its over-elaboration, State revenues falling naturally into the two classes of economic receipts and receipts from taxes, though special assessments no doubt partake of the character of both.

Book II forms the central and from the point of view of theory the most important section of the work. Its most interesting feature is the attempt to make the principle of equality the key to the whole system of taxation. Starting from the postulate that two equal incomes ought to be taxed equally, and accepting Mill's doctrine that the taxation of savings involves taxing the same income twice over, Professor Einaudi regards realised or consumed income, in the sense elaborated by Professor Irving Fisher, that is, in effect, a person's expenditure, as the true object of taxation. From this standpoint the author builds up a system of taxation of commodities, income and the succession to and transfer of property, for which he claims the dual merit that it satisfies the principle of equality and adjusts the national burdens in an equitable manner between rich and poor. It should be observed, however, that Professor Einaudi refuses to consider taxation as a means of remedying evils in the distribution of wealth.

Taxation of commodities is regarded as the ideal method of reaching consumed income; but on the ground that a large part of consumption is really personal investment in oneself or one's children, the author lays down that "investment-consumption" must not be taxed. Hence duties should be imposed only on those commodities which are normally purchased out of the consumer's surplus left available after primary needs have been satisfied; in short, luxuries and not necessaries should be taxed. Since there are technical difficulties in the way of securing sufficient revenue from taxes on commodities, the necessity for taxes on income is admitted, but the author insists that the principle of equality demands that in taxing incomes due allowance must be made for presumed savings. In this connection it is argued that the proportion of income which ought to be saved depends on (*a*) the nature and (*b*) the amount of the income, the proportions being larger in the case of incomes derived from labour than of incomes derived from capital, and in the case of small than of large incomes. Hence the principle of equality is held to justify both differentiation and progression in the income tax, as well as exemption of the amounts presumed to be devoted to "investment-consumption." Taxes on property are regarded as merely supplementary to the taxation of income, so that similar principles are applicable.

While the conception of the principle of equality as a guiding and unifying thread through the mazes of the theory of taxation is an attractive one, and while it is developed with great argumentative skill by Professor Einaudi, it does not appear to us that the results reached by the author can fairly be derived from that principle without the copious aid of fictions and unprovable assumptions. The same results, in our opinion, might be derived with less strain and greater directness from the principle of minimum sacrifice. This principle can, moreover, claim support from observed facts, whereas the doctrine that two equal incomes ought to be taxed equally is an abstract conception which does not necessarily compel assent, especially when considered in conjunction with its corollaries that higher incomes should be taxed proportionally more and lower incomes proportionally less. Indeed, Professor Einaudi's whole treatment of the subject amounts to an attack on the strict supporters of proportional taxation.

Some subjects which usually form part of treatises on public finance are deliberately omitted from this work. There is no discussion of the shifting and incidence of taxation, on the ground that this subject belongs to political economy rather than to public finance, though it is difficult to see how equality in taxation can be secured until it is known where the pressure of taxation rests. Nor is there any discussion of financial administration, which may, however, be regarded as a subject more appropriate to a work on public administration than to one on public finance.

Book III contains a full description of the chief features of the Italian system of taxation, with criticisms on questions of principle and occasional comparisons with other systems. For a brief but informing description of the Public Finances of Italy, which covers some ground not touched in the present work, English readers may be referred to the article contributed by Professor Einaudi to the *Economic Journal* of December, 1915. S.L.B.

6.—*The Data of Economics: expressly Designed for the General Reader.* By C. J. Melrose. xv + 388 pp., 8vo. London: Mitre Press, 1916. Price 7*s.* 6*d.* net.

This is one of those books by authors who do not drift in the main current of economic thought and whose work is consequently rather difficult to appraise quickly. Mr. Melrose emphatically declares that he lays "no claim to any originality whatever," but there is a certain originality in his having carried out his intention of not referring to authoritative writers (p. ix) so completely that, if his index is to be trusted, and I think it is, he has managed to write 400 pages without once mentioning or quoting from Adam Smith, Malthus, Mill or Marshall. That is perhaps a refreshing change from the ordinary practice : it makes us more uneasy to find that Mr. Melrose never finds it necessary to mention the theory of final or marginal utility when he expounds his views on value, and doubt deepens into active distrust when we find that he thinks it will be time enough to discuss the question of population when rations have been made equal and we find we have not enough to go round. His special object is to make people see what lies behind their usual way of talking in terms of money, but he is anything but clear in his conception of what is represented by the sum of money which is called the national income. He says (p. 298) that before the war it was "estimated at about 2,400,000,000*l.* of which about 300,000,000*l.* "was being invested abroad, while another 100,000,000*l.* or so went to "replace used-up plant at home. Thus the annual national "consumption, apart from capital investment, was somewhere about "2,000,000,000*l.*" It is difficult to explain the inclusion of what goes to replace used-up plant in the national income, which is understood to be the aggregate of individuals' incomes correctly calculated : if an individual calculates his income correctly, he will not include in it amounts which ought to go to meet wear and tear, depreciation, or obsolescence of plant. The entire omission of home investment, in other words of the *additional* plant, houses, &c., which constitute part of the so-called "real" income of saving people, is probably explained (though far from justified) by confusion induced by Adam Smith's unfortunate doctrine that what is saved is also consumed. When men are employed to build a factory, Smith and J. S. Mill, and apparently Mr. Melrose imagine the food which they consume to be the capital which is saved, whereas it is, of course, merely the "real" income of the workers. What the saving person gets with his money, the portion of real income which is saved and added to the community's capital is the factory itself. The only difference between investment at home and investment abroad is that in home investment the savers acquire new property at home, while in foreign investment they acquire it abroad : in neither case is it true that what is saved is consumed, since neither the money which is said to be saved in ordinary language nor the things obtained with that money which constitute the "real" income are consumed.

It is a pity that Mr. Melrose is an unsafe guide on the details of the economic machine, as a natural shrewdness prevents him from going very far wrong in the practical advice which he gives.

The publishers affix a note to the book in which they explain that it was ready to be published in September, 1914, and that only one chapter has been altered since. Then they add "It says much to the "credit of the book that there is practically nothing in it that needs "correction, or has gone out of date." They seem to think political economy is written by politicians. E.C.

7.—*The Mortality from Cancer Throughout the World.* By Frederick L. Hoffman, LL.D., F.S.S., F.A.S.A. xv + 826 pp., 8vo. Newark, New Jersey: The Prudential Press, 1915.

Among the unsolved problems of medicine that of the cause, methods of spread and prevention of cancer deserves a leading place. It has exercised some of the greatest minds of our generation and also given scope for the display of as much fantastic theorizing as the authorship of the Junius letters or the whereabouts of the ten lost tribes. The statistical branch of the subject is a medley of good, bad and indifferent publications, ranging from the admirable and dispassionate reductions of data issued by our General Register Office to pamphlets intended to prove that some article of diet is the *real* cause of cancer.

Most students have felt the want of a handbook summarizing the positive knowledge so far accumulated and bringing together such statistical data as can fairly be considered worthy of further analysis. Dr. Hoffman's aim has been to prepare such a *catalogue raisonné* and he has, in our opinion, achieved a considerable measure of success.

The first part of the book consists of a statement of the evidence in favour of the view that cancer is becoming more prevalent in civilized countries, and of a description of theories which have been advanced to account for the facts, attention being specially devoted to those theories which have been propounded on the basis of statistical evidence. The remainder, and much the larger part, of the book is a collection of charts and tables gathered from a wide range of (mainly official) publications and comprising most of the statistical data which are at present available. A bibliography is provided, which, although naturally incomplete, is still very extensive.

With the exception of the subject of alcohol—or, of course, methods of measuring associations—cancer research engenders more violence of language than any other scientific pursuit. The average cancer expert may doubt whether his solution is really quite complete (although this is rare), but he has no doubt at all that all other cancer experts are in the wrong, owing to a combination of knavery and folly which he is seldom at a loss to find words to describe. It would be going too far to say that Dr. Hoffman has altogether escaped this cancerous taint. For instance, he argues strongly in favour of the view that cancer has really increased, and much of his argument seems to us extremely cogent. But he also permits himself to indulge in such rhetoric as the following: "For it is "self-evident that if the charge is true that in the past a large number "of deaths have been recorded as due to other causes than cancer, "when, in fact, such deaths were due to cancerous complaints, the "medical and surgical profession must have been grossly derelict "in its duty and inconceivably incompetent, considering the high "degree of attained proficiency in other branches of medicine and "surgery." Still, lapses of this kind are not frequent, and Dr. Hoffman succeeds in maintaining a decidedly higher standard of controversial fairness than any other disputant we remember, a fact which is particularly honourable in him, as he has himself been assailed with considerable asperity by at least one eminent author.

Dr. Hoffman has called attention to various sources of statistical error, but there are other which he might have emphasized. In making international or even, in the case of so large an area as that of the United States, inter-state comparisons it is material to know whether the proportions of deaths uncertified by qualified medical practitioners are or are not widely different, and whether the standard of medical education is approximately constant throughout the countries compared. It is, we think, doubt respecting these matters which makes foreign observers hesitate to utilize American statistics, especially after reading Mr. Flexner's indictment of the arrangements made in certain states for the provision of medical education. We have noticed a few minor mistakes which might be corrected when another edition appears. Thus, the late Dr. Tatham was never Registrar-General (p. 34), and the John Howard McFadden Research Fund is not under the control of the Lister Institute of Preventive Medicine, as might be inferred from a remark on p. 69.

Dr. Hoffman has certainly earned the thanks of all interested in the statistical aspects of cancer, and we are sure that his book will be frequently consulted by them. M.G.

8.—*The Development of Transportation in Modern England.* By W. T. Jackman. Two vols. 820 pp., 8vo. Cambridge: Cambridge University Press, 1916. Price 24*s.* net.

Only disappointment will await the reader of these two volumes who starts with the idea that the work deals with modern transport. The term "Modern England" is used in the political history sense and without any relation to the subject matter of the book. Commencing about the beginning of the sixteenth century the history is carried down to the middle of the nineteenth century.

Mr. Jackman might well consider placing under the title of the book the dates 1500–1850. We would emphasize this by comparing the distribution of the matter with the history of modern transport. However true it may be to say that modern England dates from the Tudors, it is equally true to say that transportation in this country remained mediæval until the middle of the seventeenth century, and can hardly be called modern until a century later. Roughly, one-third of the book is devoted to the period prior to this. Then, whilst the period 1750–1850 saw the development of horse and canal transport, it also witnessed their decay. In 1850 the railway was a markedly inferior means of transport as compared with the railway of to-day. On the revival of road transport, first in urban areas by means of tramways and recently more generally by means of motor vehicles, the book is silent. Yet these are some of the most vital parts of the transport of modern England, since they are the means of conveyance most largely used by the labouring classes in their travel between their homes and their work.

As a history of transportation in the period which it covers, the volumes are of the greatest value. The first half of the Volume I deals with the history of roads, road legislation and river navigation from 1500 to 1750. Not only is the history of the development of waggons and stage coaches carefully traced, but the cost of conveyance and the toll charges have been frequently extracted from contemporary records. The struggle between roads and vehicles is fully brought out, a struggle which only closed for a time when Telford and Macadam introduced the improvements in road construction which are the foundation of our present-day system of road making. Incidentally it may be noted that the same struggle has begun again with the introduction of motor vehicles. Once again restrictions on the vehicles are urged, restrictions of a character which simply mean that the roads are not fit to carry these new types of vehicle. It is to be hoped the lesson of the past will be learnt, and that, whilst a few simple restrictions may be placed on the vehicles, the road authorities will recognize that it is the roads which must be made capable of meeting all reasonable requirements of the traffic when conveyed by motor vehicles.

The second half of the first volume is concerned with the improvement of the roads and rivers and the introduction of canals during the period 1750–1830. The day of canals was a short one in this country. The first canal built by the Duke of Bridgewater was opened to Manchester in July, 1761, and less than a hundred years later many canals had all but ceased to exist under the stress of railway competition. If the canal life was a short one it was a merry one. The dividends earned and paid were often fabulous, and it was this very ease of success which made them the readier victims of railway competition. A moderate success might have kept the management more alive and the proprietors less grasping. It might have made both less domineering and more considerate of the needs of the public.

The second volume deals with the early development of railways, and the effect of their coming on roads and canals as means of transport down to 1850. This portion of the book seems particularly to be lacking in balance. The space devoted to the beginnings of railways, the opposition to them, the claims in favour of canals, &c., seems out of all proportion to that spent on the constructive history. There are some curious errors to be found in this portion of the book which suggest that original sources have not always been consulted. Thus, on p. 481, the line from Stockton to Witton Park Colliery is said to be about *125* miles long! An error we recollect having come across before. Another error, which the present writer has been trying to overtake for several years, is found on p. 588, where the date of the foundation of the Railway Clearing House is given as 1847, "after the principle of amalgamation had been quite largely followed "out." Had Mr. Jackman made enquiry at the Railway Clearing House he would have discovered that the correct date was January, 1842, or two years prior to 1844, which, as he relates, saw the introduction of a number of Bills into Parliament for consolidating certain lines. The order of events is of importance, as Mr. Jackman recognizes, and when he has them aright he will require to alter his conclusions. Two pages earlier (p. 586) the statement occurs that "up to and including the year 1843 there had been considerable "amalgamation of railways." A reference to Mr. E. Cleveland-Stevens' book on English Railways—a recent work with which Mr. Jackman appears unacquainted—shows that the considerable number is three—in 1834, 1835 and 1840—one in each year.

The book concludes with a valuable series of Appendices and a Bibliography. Three of the former may be selected as of exceptional value. Appendix 5 gives the rate of travelling, Appendix 6 the cost of travel, and Appendix 7 the cost of carriage of goods for typical journeys practically year by year from 1750 to 1830. We have seen no lists elsewhere to compare with these for comprehensiveness. The Bibliography is very extensive and shows that Mr. Jackman's researches have extended over a very wide field. It is to be regretted that he did not make any use of the researches of Mr. Cleveland-Stevens which have been referred to above, nor does he appear to be acquainted with Mr. Lewin's book, *The British Railway System*, which is a very compact history of our railway system down to 1844. Each of these would have saved him from errors. W.T.S.

9.—*The Marketing of Farm Products.* By L. D. H. Weld, Ph.D. xiv + 183 pp., 8vo. New York: The Macmillan Co., 1916. Price 6*s.* 6*d.* net.

A recent English writer has contended that the older economists of this country, in the emphasis they gave to the cost or expenses of the production of commodities as the dominant factor in the determination of their value or their price in a competitive market, failed to draw a necessary distinction between the previous work of manufacture and the subsequent business of marketing. The same author has pointed to the separate sphere of selling, which, he maintains, has grown in relative importance, as the area in which combinations, seeking, in the form of Trusts, to avoid the waste and remove the risks of competition, have won most conspicuous triumphs. The book now before us may be said to corroborate this suggestive notion, for it is a penetrating and exhaustive review of the causes, the character, and the results of the various methods of marketing farm products followed in the United States. The merits and defects of the differing means employed are scrutinized in detail; and the successive stages of the complete process, linking the final end of the manufacturing operation with the concluding transmission of the goods from the retail shop to the consuming public, are carefully demonstrated and, in turn, examined. A judicial attitude is preserved throughout, and the painstaking and able author may, we believe, deservedly congratulate himself on having made opportunely a real contribution to a novel department of economic study. He has in short written a fresh authoritative chapter of the principles of economic practice. No such minute, discriminating survey had, we think, been previously attempted or achieved.

Professor Weld is perhaps specially interesting and instructive in his punctilious classification of the different species of the genus of "middlemen," so often embraced by irate but ignorant critics in a single condemnation. "Commission-men" and "wholesale-"receivers," "brokers" and "jobbers," may, it is true, sometimes pass insensibly from one character and function to another; but exact analysis demands their separation, no less imperatively than various kinds of sales should be distinguished, if, in actual fact, the lines of division are sometimes faint or blurred. With similar pains and acumen he shows that sale by auction, recommended as the infallible cure for some abuses, possesses advantages which hinge on the fulfilment of certain preliminary conditions. The important effects of cold storage, the place and work of "produce exchanges," the established benefit and the potential harm of dealings in "futures," are discussed with equal knowledge and detachment in other chapters; and the whole *modus operandi* of marketing farm products on the other side of the Atlantic is in fine portrayed with impartiality. We realize how experience has begot improvement, and we appreciate the lesson taught on almost every page that a sufficient reason may be found by patient and unbiassed inquiry for what might be pronounced by careless, hasty, prejudiced observers irrational, otiose or mischievous.

For the chief conclusion which emerges from this faithful, searching exploration is aptly summarized in the last chapter of the book. "There is," Dr. Weld contends, "ample economic "justification for the main features of the present marketing "organization," and "a relatively high degree of efficiency has been "attained, especially in the trades handling the great staple "commodities." There may still be defects which admit or demand remedial action. But the maligned middleman has multiplied in most, if not all, instances in obedience to a justifiable request for specialization, which has involved ultimately less cost and produced finally more efficiency. As a matter of fact, an honest consideration of expense reveals the very different situation that appears, and the wide variety of the results ensuing, in the case of divers broad categories of commodities. Even where the nature of the article itself, and the circumstances of its marketing, do not dictate the consequences noticed, it will be found that most middlemen discharge their useful office cheaply rather than expensively. Margins are perforce cut down to narrow limits; and it is in actual fact the final category of the retail shop, where the requirements of customers are at once onerous and comprehensive, which claims and receives the substantial part of the difference shown between the price paid by the consumer and the remuneration earned by the producer. "Many of the popular conceptions" are accordingly, our author pertinently remarks, "entirely unwarranted"; and "there is perhaps no field of economic activity of such widespread "interest concerning which there is so much ignorance. Even "men of scientific training have been guilty of extravagant and "sometimes absurd statements with regard to shortcomings, "wastefulness and cumbersomeness of the marketing machinery."

To the removal of this misunderstanding, and the communication of the necessary knowledge of the facts and their reasons, Professor Weld's luminous and thorough essay has been most opportunely consecrated; and his great success cannot, we feel, be impugned. His book, intended primarily for American readers, will be welcomed by English students; for the odium of middlemen and the distinctive importance of selling, as contrasted with manufacture, are not, of course, peculiar to the United States. L.L.P.

10.—*Trade as a Science.* By Ernest J. P. Benn. With Introductory Preface by the Rt. Hon. Lord Burnham. 184 pp., 8vo. London: Jarrold and Sons, 1916. Price *2s. 6d.* net.

The British merchant and manufacturer nowadays are not lacking in advice as to how they should proceed to obtain success in their future efforts to maintain and extend their trade. Mr. Benn's advice is "Organise!" The absence, in many trades, of organisation handicaps the British producer in his struggles against the organised competition of Germany and America. It leaves him helpless and inarticulate in face of political interference. It weakens him in his dealings with labour. It keeps him ignorant of important developments in manufacturing or business operations. It enhances working costs in many directions, or at least prevents their reduction, and it renders it difficult for the enterprising producer to gain the control of additional capital. In place of the existing competition and secretiveness between manufacturers or traders, Mr. Benn urges the establishment of a Trade Association for each important industry, charged, among other things, with the supervision and development of export business; the promotion of research; the advising of Government Departments and other authorities in matters of technical and commercial education; the collection and dissemination of statistics of trade, working costs, production, supplies, &c.; the encouragement of harmonious relations between labour and capital; and the arrangement of exhibits and advertisements of general trade interest.

The State is to find a place in the scheme through the establishment of a Ministry of Commerce, working in close contact with the Trade Associations. Indeed, it is suggested that some of the former's officials should be appointed, and half the salaries paid, by the latter bodies, an arrangement which would easily become unsatisfactory to the two masters, the Ministry and the Trade Association, and to their common servant.

Mr. Benn works out his scheme in much detail, and ably sets forth the advantages attaching to it. But he does not want too much organisation, at least on the part of the State. He desires each trade to find salvation mainly in its own efforts, and not to wait on political measures, whether tariffs or otherwise.

There is little doubt that the future will see a large extension of co-operative action on the part of producers and traders, and Mr. Benn's book points the way. But we shall not arrive at his goal all at once, if at all. The tradition of individualism will, and political action may, see to that. A.D.W.

11.—*The Rise of Rail Power in War and Conquest*, 1833–1914. By E. A. Pratt. 405 pp., 8vo. London: P. S. King and Son, 1915. Price 7*s*. 6*d*. net.

This work may be looked on as primarily a book of the moment. On the face of it, it is not the outcome of a long study and consideration of the problems involved in the use of railways in war. It seems rather the product of a rapid compilation from many sources of facts in regard to the use of railways in past wars with excursions into the objects aimed at, and the methods employed. These are, however, arranged in no clear order.

The first stage in the use of railways in war is for the mobilization of the forces. This is almost a preliminary stage as it will usually be carried out in the last few days before the actual declaration of war. The second stage is the concentration of the armies, and even this stage may be proceeding whilst peace and war yet hang in the balance. It is typical of the book that the first problem dealt with is "Railway Destruction in War." In spite of selecting this as the subject of a chapter, Mr. Pratt only deals with railway destruction in the American Civil War, and the matter is recurred to later in the book in odd places under such headings as "Repair of Railways in "the Boer War."

No one, who understands the intricacy of railway working will hesitate to accept the view that the railway working must be in the hands of men who are technically efficient. Whilst this is the case, the differences between the working of railways in peace and war are so great, that it is not sufficient that those in charge should have a thorough acquaintance with peace-time working. Good as the work has been which our railways have done, it is easy to see how the habit of thinking of the Company as the unit has clung and hindered our railways achieving all that they might have done. For long traffics followed their old competitive routes. Waggons have not been distributed and used with a sole eye to the carriage of a maximum traffic on the railways as a whole. Efficient control of the forwardings was not installed until considerable trouble arose. It is harmful to gloss over these shortcomings, and far better to face them and look for the remedy. They are shortcomings of which the military authorities in this country had received ample warnings.

In dealing with the Russo-Japanese War, Mr. Pratt seems to have got lost amongst the various sources of his information. A start from a wrong basis no doubt helped the confusion, for the train capacity assumed for the Trans-Siberian Railway at the outset is not more than half of what it was capable if the working had been good. The truth is the traffic working of the line was very indifferent, and the interference with the working in Manchuria was disgraceful. If Mr. Pratt will investigate the extent of the interference and its effects, he will not wobble as he does between the view that "Russia "achieved a remarkable feat in her transport of an army so great a "distance by a single-track line of railway" and his later view that "the operation of the Siberian and Eastern Chinese lines did give rise "to a degree of confusion which greatly increased the difficulties of "the position in which the Russians were placed." The great achievement of the Russians was in the work of construction of additional crossing places, sidings, &c. Their failure to make good use of these works was deplorable. How deplorable can be judged by the working of the captured railways by the Japanese, to which no reference is made.

With all its defects this book fills a gap in railway literature, and we are grateful to Mr. Pratt for it. Still we hope that in another edition Mr. Pratt will see his way to rearrange the matter so that the work may be a more connected whole. W.T.S.

12.—*The Future of South America.* (Illustrated.) By Roger W. Babson. viii + 407 pp., 8vo. Boston: Little, Brown and Co., 1915. Price (in leather) $2.50.

This book is written for the young American who desires to "make a dent in the world," in other words, for the young man with a little capital and plenty of enterprise, who wishes to make money. Some of the places where this can be done appear to be in South America and the West Indies. The possibilities of the several States and islands as regards trade and industry, and in some cases finance, are here set out by Mr. Babson after many years study on his part. He has travelled a good deal, and his remarks, besides disclosing the results of personal observation, embody the advice and opinions gathered in the course of interviews with Presidents, other public officers, and traders, in the countries he deals with. The outlook for that part of the world appears, on the whole, to be a very alluring one.

British writers on the practice of trade hardly ever fail to lecture John Bull for his slothfulness and lack of initiative in matters of foreign trade, and to exhort him to wake up and follow the example of some of his neighbours. After a course of reading on these lines, it is refreshing to find an American writer occasionally directing Uncle Sam's attention to the push and enterprise of the Old Country. But we may find ourselves with a rival for our entrepôt trade in—Panama! This appears to be subject only to the condition that Panama will not miss its destiny by erecting protective tariffs.

In surveying such a large area as South America, country by country, in a book of this compass, the author is necessarily brief, and in some cases very cursory. But so far as we can judge he has many useful things to say, which it would be worth the while of everyone to read who is desirous of opening up trade in that continent or settling there to make a living. There is also a chapter for the stay-at-home, who simply wants to invest his money in South American bonds. A.D.W.

13.—*Other New Publications.**

Brown (*Harry Gunnison*). Foreign Exchange. A Study of the Exchange Mechanism of Commerce. x + 159 pp., 8vo. New York: Macmillan and Co., 1915. Price 4*s.* net.

[This book deals chiefly with Foreign Exchange, though it also contains two introductory chapters on laws of money and the nature of banking, which, in the author's opinion, make possible a clearer understanding of the economic theory of foreign exchange transactions. The author has endeavoured to analyse more fully than is usually done the interrelations of buyers and sellers in the credit mechanism of exchange. The volume is also published as Part I of the author's "International Trade and Exchange." It is divided into the following chapters:—1. Laws of Money; 2. The Nature of Bank Credit; 3. The Nature and Method of Foreign Exchange; 4. The Rate of Exchange; 5. The Rate of Exchange and the Flow of Specie; 6. Further considerations regarding the Rate of Exchange.]

Clarke (*John J.*). Outlines of English Local Government. 40 pp., 8vo. Manchester: Workers' Educational Association, 1916. Price 6*d.*

[These outlines have been prepared for the use of students and others interested in local government. They show the relations of local authorities to public health, education and moral improvement, public assistance and the prevention of poverty. There is also a bibliography.]

Dewey (*John*). Democracy and Education. An Introduction to the Philosophy of Education. xii + 434 pp., 8vo. New York: Macmillan and Co., 1916. Price 6*s.* net.

[An endeavour to detect and state the ideas implied in a democratic society and to apply these ideas to the problems of the enterprise of education.]

Dunlop (*D. N.*). British Destiny. The Principles of Progress. xi + 113 pp., sm. 8vo. London: Path Publishing Co., 1916. Price 3*s.* 6*d.* net.

[Parts of this book have been published in a quarterly periodical, but have now been rewritten and two entirely new chapters have been added. The contents of the book are as follows:—i. British Civilization; ii. The Equilibrium of Society; iii. The Philosophy of Co-operation; iv. The Competition for Quality; v. The Magic of Industry; vi. Free Trade or Protection; vii. A National Industrial Federation.]

Durand (*Edward Dana*). The Trust Problem. 145 pp., 8vo. Cambridge (Massa.): Harvard University Press; and London: Humphrey Milford, 1915. Price 4*s.* 6*d.*

[These lectures, which are reprinted from the *Quarterly Journal of Economics*, deal with trusts and pools and are not intended to cover the whole field of monopoly or of contract in restraint of trade. The author discusses the best means of dealing with trusts and pools and their influence on prices and the general economic condition of the people. The contents of the book are as follows:—Chapters i. The Necessity of Prohibition or Regulation; ii. The Possibility of Preventing Combination; iii. Difficulties of Regulating Combinations; iv. The Alleged Advantages of Combination; v. The Trust Legislation of 1914. 1. Unfair Competitive Methods; 2. New Provisions on Combinations in Restraint of Trade; 3. Mismanagement of Railroads; 4. The Federal Trade Commission. Appendix. Federal Laws Relating to Trusts and Allied Matters: 1. Sherman Anti-Trust Law; 2. Anti-Trust Act of 1914; 3. Trade Commission Act; 4. Combinations in Import Trade; 5. Use of Panama Canal; 6. Expedition of Proceedings; 7. Witnesses and Testimony.]

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* See also "Additions to the Library," page 566, *sqq.*

Einaudi (*Luigi*). Di un teorema intorno alla Nazionalizzazione della Produzione. 23 pp., 8vo. Torino: Fratelli Bocca, 1916.

[An extract from the "Atti della Reale Accademia delle Scienze di Torino," vol. 51, 1916.]

Farrow (*Thomas*) and *Crotch* (*W. Walter*). The Coming Trade War. 164 pp., 8vo. London: Chapman and Hall, 1916. Price 2*s.* 6*d.* net.

[The authors' aim is to show how the country can best prepare to cope with the situation likely to arise after the war. The book is divided into the following chapters:—i. The Task Before Us; ii. The Danger of Drift; iii. The Gateway of the East; iv. Some Essential Reforms; v. The New Banking; vi. Wanted, National Economics; vii. Community of Interest.]

Gilman (*Stephen*). Principles of Accounting. xii + 415 pp., 8vo. Chicago: La Salle Extension University, 1916.

[This book is written primarily for those having some experience in bookkeeping. The author's endeavour has been to develop the fundamental principles of accounting according to a basic plan, and use is made of diagrams and charts to illustrate the subjects discussed. The author, who has also had practical experience of his subject, is lecturer on higher accountancy at the university which publishes the book.]

Hewitt (*Edward G.*). Activities and Wealth of the United States. 4 pp. and chart. January, 1916.

Lambert (*Henri*). International Morality and Exchange. With an introduction by the Rt. Hon. Lord Courtney of Penwith. 40 pp., 8vo. London: G. Allen and Unwin, 1916. Price 6*s.* net.

[This pamphlet, which is translated from the *Journal des Economistes*, is a powerful plea for international freedom of trade, which, by the nature and force of things, the author contends, is the best guarantee for peace.]

Le Personne (*Louis*). Notes concerning the economic situation between the Allies and Germany before and after the War. 12 pp., sm. 8vo. London: Poulton Bros., 1916.

[The author briefly reviews the development of Germany since 1870, and shows how her progress was largely helped by her commercial policy and by the world's general expansion which coincided with her forward movement. The future trade policy of this and other countries after the war in relation to Germany and to themselves is also discussed.]

Prato (*Giuseppe*). I primi rilievi dei Provvedimenti repressivi dell' alcoolismo. 20 pp., 8vo. Torino, 1916.

[Reprinted from *La Riforma Sociale* for February–March, 1916.]

——— L'occupazione militare nel passato e nel presente. Barbarie antica e civilta moderna. 53 pp., 8vo. Torino, 1916.

[Reprinted from *La Riforma Sociale.* August, September, October, 1915.]

——— Sulle premesse economiche del contratto collettivo di lavoro. Appunti critici. 76 pp., 8vo. Torino: Fratelli Bocca, 1916.

[Reprint from the "Atti della Reale Accademia delle Scienze di Torino" (anno 1915-16).]

Pratt (*Edwin A.*). A London Transport Trust. Criticism of an impracticable scheme. (Central Goods Clearing House.) 70 pp., 8vo. London: P. S. King and Son, 1916. Price 1*s.* net.

[This pamphlet is a criticism of the scheme projected by the New Transport Company, Limited, for a goods clearing house. While the present conditions attending the collection, transport and delivery of goods may have their shortcomings, the scheme as advocated by the trust company is, in the author's opinion and that of several railway officials, impracticable.]

Richardson (*Alex.*). The Man-Power of the Nation. Suggestions as to Industrial Efficiency for Employers and Workers. 111 pp., sm. 8vo. London: Office of *Engineering*, 1916. Price 1*s.*

[A reprint of articles contributed at various dates by the author to *Engineering.* They are issued in this more accessible form in the hope that they will be considered by employers and employed in all departments of the mechanical industry. A table of contents, which is not given, would have been an advantage to readers.]

Savorgnan (*Professor Franco*). Intorno all approssimazione di alcuni indici della distribuzione dei redditi. 71 pp., 8vo. Venezia: Carlo Ferrari, 1915.

[Reprinted from the "Atti del Reale Istituto Veneto di Scienze lettere ed arti." Anno accademico 1914-15. Tomo lxxiv. Parte Seconda.]

——— Sulla formazione del valori dell'indice di cograduazione. Nota Metodologica. 37 pp., 8vo. Cagliari: Societa Tipografica Sarda, 1916.

[Reprinted from the "Studi Economico-Giurudici pubblicati per cura della Facoltà di Giurisprudenza." Anno vii, 1915. Parte 1.]

Woolf (*L. S.*). International Government: Two Reports prepared for the Fabian Research Department, together with a project by a Fabian Committee for a Supernational Authority that will prevent War. 259 pp., 8vo. London: Fabian Society, 1916. Price 6*s.* net.

[This volume is the outcome of a Committee of the Fabian Research Department, and the practice of the Department is to leave its investigators a free hand, not assuming any responsibility for their conclusions. To Mr. L. S. Woolf was committed the task of preparing two reports (which appear as Part I. An International Authority and the Prevention of War; and Part II. International Government); and upon this investigation the Committee drafted what now stands as Part III. (The Supernational Authority that will Prevent War). There is a select bibliography and an index.]

Canada. Canada: The Country of the Twentieth Century. By *Watson Griffin.* 283 pp., 8vo., maps, &c. Ottawa: Department of Trade and Commerce, 1915.

[A description of the Dominion prepared for the purpose of giving business men who have not been in Canada, a comprehensive review of its agricultural and other resources, its industrial and commercial development, and its geographical relation to the markets of the world.]

India. *Bengal Economic Journal*, April, 1916. Vol 1. No. 1. 8vo. Calcutta and London: Macmillan and Co., 1916. Subscription 10 rupees per annum; single copy 4 rupees.

[This is the first issue of the journal of the Bengal Economic Association, whose objects are the encouragement of the study, practical and theoretical, of the problems that bear on the well-being of India, and in particular of Bengal. Among the aims of the journal will be that of digesting and making readily available the mass of material issued yearly by Government Departments. A review is also intended of Indian economic legislation of each year, and the journal will contain reviews of current economic literature.]

——— Statistical Tables relating to Wheat. 32 pp. and charts, fol. Calcutta, 1916. Price 13 annas.

[These tables have been prepared with a view to bringing together in a handy form the principal statistical data relating to Indian wheat, with special reference to area, output, exports, prices and freights.]

Japan. Graphiques statistiques sur l'état de la Population de l'Empire du Japon. 4to. 1916.

[A collection of thirteen coloured diagrams and cartograms illustrating the increase and density, and age and sex distribution of the population of Japan at the census of December 31, 1913.]

——— Kyoto Imperial University, College of Law. *The Economic Journal.* Vol. ii. No. 5. May, 1916. Malthus Commemoration Number. 8vo. Kyoto, 1916.

United States. Mechanics and Metals National Bank. War Loans and War Finance. An analysis of the war costs, war loans, and government indebtedness of Europe, in their relation to the world at large. 47 pp., sm. 8vo. New York, 1916.

[Compiled for the purpose of giving, in a convenient form, a summary of Government loans that have been made since the beginning of the war. It is divided into the following heads:—1. The Economics of War; 2. Cost of the War; 3. Loans; 4. Loans in the United States; 5. War Debt; 6. Interest on Debt; 7. Wealth of the Nations; 8. The Future.]

Liverpool. Handbook of Employments in Liverpool. Edited by F. J. Marquis, M.A., Warden of the Liverpool University Settlement; with a Preface by Alderman F. J. Leslie, Chairman of the Juvenile Employment Committee. xxvii + 277 pp., 8vo. Liverpool: Education Committee, 1916. Price 1*s.*

[This book had been compiled for the use of the Juvenile Employment Committee, formed in 1911 by the Liverpool Education Committee to assist youthful applicants in securing suitable employment. It gives particulars of the nature and extent of local employments open to Liverpool youths, the numbers engaged in them, the qualifications required, the wages paid, and the possibilities of future advancement. The book was commenced and much of the statistical matter compiled before the war, which will necessitate its revision, but the Committee are of opinion that it should be published now, containing as it does information of permanent value, not so far available to those requiring it. Its contents are as follows:—Preface; introduction; Liverpool Trades and Occupations; Schedule of Liverpool Employments and Wages. Appendix: (1) Liverpool Juvenile Employment Scheme; (2) Facilities for Continued Education in Liverpool other than Secondary Schools and the University; (3) Scholarships, Studentships, and Free Places for Liverpool Children for the Continuation of their Education; (4) Bye-laws Governing the Employment of Children in Liverpool out of School Hours; (5) Regulations and Instructions regarding Street Trading; (6) Employment of Juveniles in Factories and Shops; (7) Schedule showing Minimum Age Standards for Dangerous Trades. Index of Trades and Occupations.]

Royal Geographical Society. The Investigation of Rivers. Final Report. 92 pp., charts and diagrams, 8vo. London: The Royal Geographical Society, 1916. Price 3*s.* 6*d.* net.

[This investigation was commenced in 1906 with the aid of Government and other grants, the aim being the examination of certain rivers in England and Wales for the purpose of ascertaining, (*a*) The discharge in winter and summer, and the total annual discharge; (*b*) The suspended and dissolved matter in wet and dry periods, the total amounts carried in the year, and the erosion of the land-surface in tons and depth of inches; (*c*) The rainfall in different parts of each basin and the average rainfall over the whole basin; (*d*) The area of each basin, and the elevation of different parts of it. The area occupied by calcareous and non-calcareous formations, and by pervious and impervious formations. The rivers selected were the Exe, Medway and Severn, and others were intended when the investigation had to be closed.]

CURRENT NOTES.

The Trade Accounts for July complete the record for the second year of war. In the table given below we show the comparative figures for each of the two war years and the last twelve months of peace. There is a good deal that is worth careful study in these figures. It will be noted that, in the first year of war, imports were valued at slightly more than in the last year of peace, while exports decreased in value by over 190,000,000*l*. During the twelve months ended July this year, there was an increase of 134,000,000*l*. in the value of imports, and of 116,000,000*l*. in the value of exports. That higher prices have contributed largely to both changes we know, but the expansion of exports by more than 25 per cent. is nevertheless a remarkable recovery. Apart from the rise in prices, the expansion of imports is a phenomenon which may seem less remarkable, as it reflects our drafts on other countries for food and raw materials, while there is an undisclosed addition to be made to the figures in the table on account of Government purchases not included in the published accounts. The decrease, as compared with the last peace year, of 36 per cent. in the tonnage of shipping entered with cargoes from overseas and of 46 per cent. in the clearances outwards makes the figures of the value of merchandise carried the more remarkable.

The figures relating to bullion appear not to cover all the movements of the metal. If they did so they would mean that we absorbed nearly 22,000,000*l*. in gold during the first year of war, and have shipped nearly 44,000,000*l*. abroad on balance during the twelve months just completed.

The values of the principal classes of merchandise imported and exported in the twelve months ending July, 1916, 1915 and 1914, respectively, were as follows:—

	Twelve months ending July, 1916.	Twelve months ending July, 1915.	Twelve months ending July, 1914.
Imports, value c.i.f.—	£'000.	£'000.	£'000.
I. Food, drink and tobacco	401,898,	356,894,	287,811,
II. Raw materials and articles mainly unmanufactured	300,307,	258,788,	277,484,
III. Articles wholly or mainly manufactured	194,885,	147,569,	194,965,
IV. Miscellaneous and unclassified (including parcel post)	2,988,	2,579,	3,234,
Total merchandise	900,078,	765,830,	763,494,
Imports of bullion and specie	23,196,	40,570,	75,110,

	Twelve months ending July, 1916.	Twelve months ending July, 1915.	Twelve months ending July, 1914.
	£'000.	£'000.	£'000.
Exports of produce and manufactures of the United Kingdom, value f.o.b.—			
I. Food, drink and tobacco	28,136,	24,148,	33,459,
II. Raw materials and articles mainly unmanufactured	59,433,	45,885,	69,893,
III. Articles wholly or mainly manufactured	348,970,	269,556,	405,834,
IV. Miscellaneous and unclassified (including parcel post)	17,895,	9,613,	11,702,
Exports of foreign and colonial merchandise, value f.o.b.—			
I. Food, drink and tobacco	21,223,	21,858,	16,902,
II. Raw materials and articles mainly unmanufactured	53,741,	46,981,	64,034,
III. Articles wholly or mainly manufactured...........................	25,043,	20,196,	28,237,
IV. Miscellaneous and unclassified	74,	69,	138,
Total British, foreign and colonial	554,515,	438,306,	630,199,
Exports of bullion and specie	66,827,	18,749,	66,083,
Shipping—	Tons net. '000.	Tons net. '000.	Tons net. '000.
Total, British and foreign, *entered* with cargoes	31,753,	34,539,	49,524,
Total, British and foreign, *cleared* with cargoes	36,997,	40,048,	68,473,

Retail food prices continue to advance. According to the Board of Trade returns given in the *Labour Gazette*, the increase from July, 1914, to May 1 was 55 per cent., to June 1 59 per cent., and to July 1 61 per cent. British and imported meat advanced during May by about 8 and 9 per cent. respectively, and old potatoes during June showed a further large advance, averaging about 30 per cent. Apart from this advance in potatoes there was a small net decrease in prices during June. The figures given are for large and small towns together: in the large towns alone the rise has been somewhat greater, amounting to 65 per cent. up to July.

In a reply to a question by Mr. Barnes, the President of the Board of Trade gave details as to the increase in cost of other items of expenditure for certain months since the commencement of the war; details will be found in the *Times* for August 9. Up to June, 1916, it is estimated the cost of clothing had increased by 55 per cent., of fuel and light by 40 per cent., of miscellaneous items by 30 per cent., while rents had been practically stationary. Combining these figures with those for food, in approximately the proportions corresponding to the expenditure of a working-class family, the increase in the cost of living may be estimated at 45 to 50 per cent. from July, 1914, to June, 1916.

A further rise of nearly 10 per cent. was recorded in April in the general level of food prices in Berlin, followed by a slight fall of 1·7 per cent. during May. As a result the percentage increase from July, 1914, amounted to 116 per cent. in May as against 119·8 per cent. in April. In Vienna the figures published in the *Warenpreisberichte* show a rise of over 5 per cent. in retail food prices during April and a further rise of over 4 per cent. during May, making the total increase from July, 1914, 128·1 per cent. Regarded as an index to the state of food supplies, the figures for both Berlin and Vienna must, as has been repeatedly pointed out in the *Labour Gazette*, be accepted with considerable and increasing reserve, since many of the most essential foods are no longer sold in a free market nor obtainable in any but strictly limited quantities.

The movement of wholesale prices, as shown by the *Statist* and *Economist* index-numbers, is as follows :—

	Statist index-number.	*Economist* index-number.
July, 1914	82·4	116·6
April, 1916... ...	134·2	190·5
May, 1916	135·4	199·0
June, 1916	130·8	191·5

It will be seen that there was a very marked fall in prices between May and June. "The greatest fall," the *Statist* comments, "has occurred in foodstuffs, more particularly in meat; but it has "been more or less general, with the exception of textiles, which "have further advanced. The fall in wheat and flour was pronounced. ". . . Sugar is also distinctly cheaper, while among minerals "copper, tin and lead have fallen. On the other hand, coal is dearer. "Among textiles, cotton and jute have fallen, while flax, wool and "silk are higher."

The *Gazette* price of British wheat, which was 54*s.* in April, rose to 55*s.* 2*d.* in May, but fell sharply to 50*s.* 2*d.* in June.

Since the end of February the percentage of trade-union members unemployed has remained steadily at 0·5 per cent. In the insured trades, however, the figure has continued to fall: from

0·7 per cent. at the end of April, it dropped to 0·6 per cent. at the end of May and 0·5 per cent. at the end of June. The calling to the colours of men of military age has accentuated the shortage of labour, and while the number of workpeople in industry is, of course, much less than a year ago, those remaining are more fully employed. At the end of June, 1915, the trade-union returns showed 1 per cent. of their members as unemployed.

The employers' returns for the textile and other industries show a slight continued fall in the numbers employed during May and June, but on the whole a small increase in the wages paid. Compared with a year ago the numbers employed in the textile trades at the end of June showed a decrease of 2·2 per cent., while the wages paid show an increase of 6·4 per cent. In the other trades covered by the returns, the numbers employed showed a decrease of 3·8 per cent., while the wages paid showed an increase of 3·5 per cent.

In Germany the trade-union returns showed 2·5 per cent. unemployed at the end of May, as compared with 2·3 per cent. at the end of April and 2·2 per cent. at the end of March. "The necessity "for careful economy in textile goods and clothing" has raised the percentage of unemployed in the textile workers' union (Soc. Dem.) from 10·3 in March to 13·5 in May. In the small union of hatmakers the percentage has increased from 22·6 in March to 43·3 in May.

In December, 1914, a meeting of business men was called by the Mayor of Philadelphia to consider what steps the community could take with regard to the unemployment problem. As it was held that the municipality should acquaint itself with the broader aspects of the problem, Mr. J. H. Willits, Instructor in Industry in the Wharton School of Finance and Commerce of the University of Pennsylvania, was appointed to carry out an inquiry, and his report has now been issued as a supplement to the *Annals of the American Academy of Political and Social Science.* In Part I Mr. Willits describes the facts of unemployment in the principal occupations and industries of Philadelphia and the district—textile, lace, carpet and hosiery manufacture; the clothing industry; the manufacture of steam and electric railway equipment and of ships; the building trades; longshoremen; departmental stores and agricultural labour. Charts are given showing the percentage of full time worked and the seasonal fluctuations of employment. Part II deals with the cost of unemployment to the employee by the loss of annual wages and the indirect effects, *e.g.*, on crime, and to the employer by loss of output and loss of efficiency in the worker. The importance of the problem being thus established, the following section suggests the means of obtaining further information. Apparently there has hitherto been little or no official information available, but arrangements have now been made with the State Department of Labor and Industry to collect from 250 typical manufacturing concerns monthly statements as to the numbers employed (full time and part time), the number of hours worked and the pay roll. It is suggested that the Consumers' League should also make further investigations; that the Wharton School should offer a course in unemployment, and eventually establish a Department of Unemployment, and that the Pennsylvania School for Social Workers should pay special attention to the subject. In the concluding Parts the relation of management to unemployment and the duty of the City Government are discussed. Employers ought, in the first place, to obtain full information as to their own works; the actual number of hours made in plant against the number of hours that would have been made if all had worked full time; the numbers of absences, with their reasons; the numbers of new employees taken on and the numbers dismissed, with the reasons, and so forth. Costing and its relation to selling price should be more carefully considered. An excessive labour reserve should not be maintained, and endeavours should be made by better methods of "hiring and firing" (a catching phrase), by training workers to more than one task, and by reducing fluctuations, to lessen the "labour turnover," *i.e.*, the proportion of hands taken on in a year to the average number employed. Few firms had any idea how great their turnover was. In a certain carpet mill, in which conditions were favourable to a low turnover, it was found that 75 per cent. of the men and 66 per cent. of the women remained in the employment of the firm for less than a year; 48 per cent. of the men and 37 per cent. of the women remained for less than ten weeks. Yet the foreman asserted that few hands did good work till they had been eight weeks with the firm, and on seeing the results his comment was "Who'd a' thought it!" In this shop the annual average number of hirings (less permanent increases) amounted to no less than 90 per cent. of the average number employed.

Employers can further lessen unemployment by reducing time lost waiting for materials, &c., by more carefully balancing different departments, so that one is not kept waiting for the output of another, by decreasing the time occupied in stocktaking, and by better organisation of work in lieu of producing according to volume of orders in sight. The City, on its part, can do little by better distribution of municipal work, though work not of a pressing nature might be reserved for times of stress, but it should establish a Municipal Employment Bureau. The Consumers' League might also help, when industry is slack, by initiating a campaign to "Buy now," "Hire now," "Build now," and so on, on the same lines as the "Shop early" campaign.

The summary of the Report on Condition of Woman and Child Wage Earners in the United States (issued in the Bulletin, Whole Number 175, of the U.S. Bureau of Labour Statistics) gives in a condensed form the results already published in the 19 volumes of that report. It includes the results of certain inquiries with regard to which little, if any, exact information has been obtained in the United Kingdom. In the cotton textile industry wages have been classified according to sex and age, those of men and women of 21 years and upwards, being given separately (p. 62).

Number and per cent. of employees 21 years and over earning a stated amount and over, in a representative week in cotton factories investigated.

	New England Group.				Southern States Group.			
	Number.		Per cent.		Number.		Per cent.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
$								
5 and over	3,848	7,424	83·8	80·3	4,503	3,618	72·1	55·4
6 ,,	3,495	6,250	76·1	67·6	3,760	2,555	60·2	39·1
7 ,,	3,044	4,953	66·3	53·6	2,876	1,574	46·0	24·1
8 ,,	2,608	3,618	56·8	39·2	2,085	870	33·3	13·3
9 ,,	2,174	2,612	47·3	28·3	1,422	448	22·7	6·8
10 ,,	1,682	1,622	36·6	17·6	838	198	13·4	3·0
11 ,,	1,223	882	26·6	9·6	457	67	7·3	1·0
12 ,,	790	460	17·2	5·0	245	23	3·9	·3

In the North the proportion earning $5 and over is much more nearly the same for each sex, than in the South. The proportion of women in the North earning these higher rates is invariably higher than the proportion of men in the South earning these rates.

The age period 18 and under 21 years is perhaps the period when there is least difference in circumstances between the two sexes, and when difference due to any inherent sex disqualification should be most apparent. In the northern group at this age period 72·1 per cent. of the men and 73·6 per cent. of the women earned $5 and upward; 37·5 per cent. of the men and 38·5 per cent. of the women earned $7 and upwards. A smaller proportion of women than of men earned rates above $8; but the withdrawal of experienced women through marriage even at this age period is probably the explanation of this difference.

The inquiries into the contribution of sons and daughters of 16 years and over to the upkeep of the home, bring out an illuminating fact. Speaking of the cotton textile workers the Report states that "these figures show clearly that in each nativity and race group, "in New England and in the South alike, the females contributed "a much larger proportion of their earnings to the family support "than did the males. To such an extent is this true, that though "the males invariably average higher earnings than the females yet "the average amount they contributed to the family was less in "each section than that contributed by the females." (p. 70) Selecting families in which either women or children were engaged in the men's ready-made clothing manufacture, it was found that in families having sons of 16 and upwards at work, these sons contributed 36·5 per cent. of the family income, and in families having daughters of 16 and upwards at work these daughters contributed 39·7 per cent. of the family income. This difference "is somewhat affected "by the greater number of female wage earners in this age group; "they average 1·6 per family, while the male children 16 years of age "and over average but 1·4 per family. On the other hand the "earnings of the females are everywhere lower than those of the males, "so that the contributions of the former are proportionately more "generous than those of the males." (p. 105.) The sons never retained less on an average than one-fifth of their earnings for their own use, while the daughters never retained on an average quite one-tenth. In families in which women or children were employed in the glass industry "for the group as a whole the adult female "children contribute a distinctly larger portion of their earnings to "their families than do the adult male children, 86·4 per cent. as "against 74·6 per cent." (p. 162.) In the silk industry "in every "group the females contributed a considerably larger proportion of "their earnings than the males, but the difference between the sexes "is greater in New Jersey than in Pennsylvania. The proportion "of earnings contributed by males is larger in the foreign-born than "in the native-born families." (p. 203.)

Collating the returns as to the percentage of their earnings contributed to the family income by children of 16 years and upwards, we have:—

Industry.	Males.			Females.		
	Native born, native parents.	Native born, foreign parents.	Foreign born.	Native born, native parents.	Native born, foreign parents.	Foreign born.
Cotton textile—						
New England group	68·7	89·6	82·6	93·4	92·8	96·9
Southern group	72·7	—	—	89·0	—	—
Men's ready-made clothing	74·7	72·0	79·8	90·1	91·3	93·2
Glass—						
White race	67·8	73·5	80·4	81·2	85·4	90·5
Coloured race	72·7	—	—	91·0	—	—
Silk—						
New Jersey	78·5	73·8	82·2	91·3	96·4	95·5
Pennsylvania	73·1	86·9	89·5	92·5	98·2	97·4

The chapter on wage-earning women in stores and factories introduces a descriptive heading which is new in such a connection. The amazing classification of women as "adrift" if they are not "living with relatives who in time of need or temptation could give "them financial aid or moral support," diminishes the value of the report. "Thus she was considered as being adrift, even though "living with relatives, if they could not in case of need give her "help of either kind. Thus, a widow supporting herself and her "small children would be looked upon as practically without a home, "since the family relationship had become for her a liability instead "of an asset." (p. 210.)

An inquiry into the causes of death among cotton factory operatives was carried out in three cities, the population being classified in five race groups: American, English, French-Canadian, Irish, and other races. "A comparison of the proportion which each "of these groups furnished of the population and of the deaths "showed that the Irish everywhere and for each period furnished "a much larger percentage of the deaths than they did of the "population, and this disproportion was especially marked in the "deaths from tuberculosis. . . . The relatively large number "of Irish deaths cannot be ascribed to any one age, sex, or occupa-"tion group, but must be considered characteristic of the race as a "whole. Americans exhibited less susceptibility to tuberculosis "than any of the other races, showing only one-half the average "mortality of all the races from this cause; then came the English "with only two-thirds of the average mortality from tuberculosis; ". . . . and last of all the Irish, among whom it rises to almost "double the rate for all races combined." (p. 370.)

On the other hand, the Irish, both operatives and non-operatives, showed a lower proportion of deaths from parturition than prevailed among the non-Irish.

A report on the recent development of German agriculture by Mr. T. H. Middleton has been issued by the Board of Agriculture (Cd. 8305, price 4*d*.). The report was prepared, Lord Selborne states, in the prefatory note, at his request, since he had reached the conclusion that "if agriculture in Germany had made no more "progress than it had in the United Kingdom during the period "1895 to 1915, the German Empire would have been at the end of "its food resources long before the end of the second year of the war, "and that, as a matter of fact, the war was being fought by it just as "much on an agricultural as on a military organisation of the "nation." From an examination of the figures relating to production, Mr. Middleton considers that the following statements appear to be justified:—On each 100 acres of cultivated land:

(1) The British farmer feeds from 45 to 50 persons, the German farmer feeds from 70 to 75 persons.
(2) The British farmer grows 15 tons of corn, the German farmer grows 33 tons.
(3) The British farmer grows 11 tons of potatoes, the German farmer grows 55 tons.
(4) The British farmer produces 4 tons of meat, the German farmer produces 4¼ tons.
(5) The British farmer produces 17½ tons of milk, the German farmer produces 28 tons.
(6) The British farmer produces a negligible quantity of sugar, the German farmer produces 2¾ tons.

Between the early eighties and the five years ending 1913 the yield of cereals in England and Wales increased but little, while the yield in Germany increased enormously, by 60 per cent. or more, and now stands at a slightly higher level than in this country, though "the British farmer is much the more favoured by nature." As regards the production of meat per 100 acres, the greater production in Germany is due to the quantity of pig meat, as will be seen from the following table taken from p. 10 of the report:—

Produce.	Production in tons per 100 acres of cultivated land.	
	Great Britain.	Germany.
Beef	1·49	1·29
Mutton	0·82	0·09
Pork, hams, and bacon	0·99	2·42
Other butcher meat*	0·31	—
Poultry and eggs	0·36	0·47
Total	3·97	4·27

* Heads, heart, liver, &c., and loose fat included under the respective kinds of meat in the German figures.

Of 100 acres of cultivated land, the following is the percentage under different crops in England and Wales and in Germany respectively :—

Crop.	England and Wales.	Germany.
Grasses, clovers, &c.	69·04	32·19
Cereal crops	19·50	45·97
Beans and peas	1·66	1·58
Potatoes	1·59	10·44
Root crops, cabbages, rape	6·24	4·66
Gardens, fruit, vineyards	0·44	2·51
Miscellanea	0·37	0·35
Fallow....	1·16	2·30
	100	100

Areas under 1 acre are not included in England and Wales, but account for a large part of the German area returned as gardens, &c. The most striking differences are those for corn crops, grass and potatoes. While the German potato crop, however, is largely used for pig feeding and to a less extent for spirit and starch manufacture, the saleable portion of the English crop is used for human food.

The actual methods of tillage adopted in the growing of corn, potatoes, &c., in Britain are not inferior to the methods adopted in Germany, but the difference in total production is due to the large proportion in Britain of cultivated land under grass. German land is mostly tilled by peasant owners, British land by tenants. The German depends to a great extent on woman labour, provided by the families of the occupiers; wages are relatively low and rural industries help to provide winter employment and tend to cheapen summer labour. Much attention has been given to organising production from German soil, the credit system is well adapted to promote good farming, co-operation is largely resorted to and education has been well developed. German economic policy in recent years has favoured agriculturists, who have benefited partly from the higher prices resulting from tariffs and partly from the steadying effect which the known policy of the State has had upon the industry. As a result there has been a very rapid improvement in the technical methods of the German farmer.

Professor Sir W. Schlich has contributed to the *Journal of Forestry* for July, 1916, an article on "Forestry in the United Kingdom: the case restated." The importance of forestry to the nation is emphasised, and our dependence on imports—imports on the indefinite continuance of which we cannot safely rely. Prices have steadily risen during the twenty years before the war and are likely to rise further in the future, though a temporary depression may occur immediately after the conclusion of peace. An increase of the area under wood will secure the country against any unexpected emergency in the future, and if brought about by the afforestation of surplus lands will keep a large amount of money in the country, will create work and lead to the development of additional industries. It is suggested that: (*a*) The State may encourage afforestation by private proprietors by giving them financial assistance whenever necessary. (*b*) Municipalities may acquire land and convert it into Corporation forests. (*c*) The State may acquire surplus land and afforest it. All three agencies should be put into motion. There is no necessity, Professor Schlich considers, to rush the matter. The Commission of 1909 suggested the afforestation of nine million acres at the rate of 150,000 acres a year, but he thinks it would suffice if the three agencies together planted a minimum of 30,000 acres annually up to a maximum of three million acres. A sum of 10*l.* per acre or 300,000*l.* a year would probably be required for the whole scheme even if private proprietors and corporations were not to take part in the operations. To secure success from the very outset it is suggested that a separate branch for forestry should be created in the Board of Agriculture, to consist of a Director of Operations, who should be a duly qualified forestry expert, assisted by an adequate number of trained Inspectors to supervise the field-work.

Part V of *Mariages, naissances et décès en Suisse de* 1891 *à* 1900, dealing with the causes of death, has now been issued. The period to which these volumes relate is now so remote that the actual results hardly seem to call for special notice, but the effects of a change of method in certifying the cause of death are of interest, as they clearly exhibit the improvement that may be effected by making such certification confidential. The federal law of December 24, 1874 prescribed that the register of deaths should show the cause of death attested by the doctor "autant que possible." Regulations promulgated in accordance with the law instructed the registrar not to regard the notice of death as complete until a doctor's certificate was submitted, this certificate to be required unless the registrar was convinced that it was impossible to obtain it within the prescribed period. The cause of death was transcribed from this certificate into a register at the office of the registrar and a statistical extract of this register was subsequently forwarded to the federal statistical bureau. It was not till 1884 that the proportion of deaths medically certified reached as high a proportion as 90 per cent., and the certification was often imperfect, secondary causes being given instead of the primary cause and often mere symptoms of little or no meaning. In order to effect some improvement a new card was devised on which the cause of death could be certified directly by the medical man himself. The card was in three parts. On the upper section, which is readily detachable, the registrar enters the name of the deceased, and on the second section the place and date of death, the profession or occupation of the deceased and his civil condition. Having filled in these two sections the registrar forwards the card to the doctor, who fills in the answers to questions relating to the cause of death in the third or lowest section of the card. Having done this he detaches the upper section with the name, inserts the card in a special envelope forwarded by the registrar and bearing the number of the card, and returns it to him. On receipt of this, the registrar compares the number or numbers on the envelope with his register and notes them, and then transmits the envelope, unopened, to the federal statistical bureau. Only when they reach this bureau are the envelopes opened and the cards dealt with. The process is thus absolutely confidential, as the name is detached from the card as soon as the cause of death is entered thereon. As a consequence of this change of method the numbers of deaths returned as due, for example, to syphilis were, in some cantons, more than doubled.

An article on the calculation of a population by methods of interpolation, by E. J. Gumbel, has been published as an Ergänzungsheft to the *Archiv fur soziale Hygiene und Demographie*, and forms a useful review of the various methods that have been used or suggested for calculating intercensal or postcensal populations. After an introductory chapter on the nature of the problem and the necessity in appropriate cases for some method of graduation, the author first considers methods of interpolation by the use of some form of average, *e.g.*, for obtaining a central population. Arithmetical and geometrical interpolation are typical cases; but the author also suggests the use of other assumptions as to the mode of growth of the population, *e.g.*, that the central population corresponds to the harmonic mean. Somewhat unexpectedly, the method based on this assumption, in the two cases tried, gives much the best results. The author then passes to the use of interpolation formulae involving more than two constants (difference and other methods, for example those that assume a change in rate of growth with density), and then to methods which take account of the movement of the population, such as Dr. Snow's (JOURNAL, vol. 74, 1911). This last class of methods might perhaps have been more fully treated with advantage.

The King's Birthday Honours list included the names of the following Fellows of the Society:—Mr. W. H. Beveridge, who has been made a Companion of the Bath; Mr. J. Arthur E. Burrup, I.S.O.; Mr. Henry Birchenough, C.M.G., who has been made a Knight Commander of St. Michael and St. George; Mr. Bernard Mallet, C.B., who has been made a Knight Commander of the Bath; Mr. Tonman Mosley, C.B., who has been raised to the Peerage as Baron Anslow; Mr. Walter Peacock, who has been made a Commander of the Royal Victorian Order; Mr. R. H. Rew, C.B., who has been made a Knight Commander of the Bath; and Mr. M. Armand Ruffer, C.M.G., M.D., &c., who has been made a Knight.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

Accountants' Magazine—

June, 1916—Book-Keeping for Foreign Branches.

July, 1916—Ancestor's Creditors.

Associated Accountants' Journal. July, 1916—Decimal Money, Weights and Measures: The Decimal Association: Series of Suggestions: *Parsons* (*G. O.*).

Bankers' Magazine—

June, 1916—The Great Crisis: xxiii. Progress of Banking in Great Britain and Ireland during 1915. The Great Credit Banks of Germany: *Palgrave* (*Sir R. H. I.*).

July, 1916—The Great Crisis: xxiv. Banking Profits in the First Half of 1916. Note Issues and the War. International Trade as a sign of National Prosperity. Problems of War Finance.

Economic Journal. June, 1916—Economic Influence of the War on the United States: *Seligman* (*E. R. A.*). British and German Export Trade before the War: *O'Farrell* (*H. H.*). The Meat Problem in Germany: *Stocks* (*Mary*). War and Wages in the Iron, Coal and Steel Industries: *Rawson* (*S. W.*). The Position of the Woman Worker after the War: *Hutchins* (*B. L.*). Japan's Financial Opportunities: *Sanders* (*T. H.*). Central Europe after the War: *Nicholson* (*J. S.*). Women in Industry: *Bosanquet* (*Helen*). The Monetary Difficulties of Early Colonisation in New Zealand: *Bedford* (*H. D.*). Women Traders in Medieval London: *Abram* (*A.*).

Eugenics Review. July, 1916—Heredity and Environment: *Darwin* (*Major Leonard*). Ultimate Victory: *Reid* (*Dr. Archdall*). The Study of Heredity: Part II: *MacBride* (*Prof. E. W.*).

Financial Review of Reviews. June, 1916—The National Debt: *Dillon* (*Dr. E. J.*). Investment after the War: *Gardner* (*J.*). Home Railway Problems: *The Editor*. The Real Labour Problem and its Solution: *Good* (*E. T.*).

Bulletin of the Imperial Institute. January–March, 1916—The Occurrence and Utilisation of Zinc Ores: Part 2. Utilisation of Peat: II. Cultivation and Utilisation of Sunflower, Niger, and Safflower Seed. Recent Progress in Agriculture and the development of Natural Resources.

Journal of the Institute of Bankers. June, 1916—Report of Council and Proceedings at Annual General Meeting. An early description of the Bankers' Clearing House.

UNITED KINGDOM—*Contd.*

Royal Meteorological Society Journal. *July*, 1916—The Meteorology of the Globe in 1911: *Shaw* (*Sir Napier*). The Persistence of Wet and Dry Weather: *Newnham* (*E. V.*). Discontinuities in Meteorological Phenomena: *Turner* (*H. H.*). Luke Howard's Meteorological Journals: *Marriott* (*W.*).

Journal of the Board of Agriculture—

June, 1916—Manurial Values of Concentrated Foods in Relation to Cost of Food in the Production of Milk: *Mackintosh* (*James*). Silage made from Oats and Tares as a Food for Milking Cows: *Oldershaw* (*A. W.*). Fecundity of Hens in Relation to Size of Egg: *Brown* (*Edward*). Agricultural Education and Live Stock Improvement in Wales. Instruction in Light Farm Work and Milking for Women and Children.

July, 1916—The Influence of Palm Kernel Cake on the Production of Milk and Butter: *Crowther* (*Charles*). Cost of Summer Feeding in Milk Production: *Garrad* (*G. H.*). A Preliminary Enquiry into the Cost of Production of Silage in East Anglia: *Amos* (*Arthur*) *and Oldershaw* (*A. W.*). On taking Samples of Soil for Soil Surveys: *Russell* (*E. J.*). A Country Scheme for Training Women for Farm Work: *Dowling* (*R. N.*). The Price of Milk.

Journal of Royal Sanitary Institute. *June*, 1916—Food Inspection: Standard of Purity of Food-supply in War-time, and the Utilisation of Condemned Stores: *Mason* (*J. W.*). Tubercular Diseases of Children and Milk Supply: *Beattie* (*J. M.*). Made-down and Tenemented Houses: *Pettit* (*G. M.*).

Public Health—

June, 1916—The Seasonal Prevalence of Infectious Disease. Epidemic Cerebro-Spinal Meningitis. The History of the Birth and Death Rates in England and Wales from 1570 to the present time: *Brownlee* (*John*) (*continued in July number*).

July, 1916—Some Points in connection with Scarlet Fever: *Milne* (*Leslie*).

Ireland. Journal of Department of Agriculture. *April*, 1916—Tobacco Growing in Ireland—the Experiments in 1915. Live Stock Feeding Experiments. Classification of Eggs for Market. Rural Science and School Gardening: *Johns* (*W. H.*). Winter Egg Records, 1915–16.

INDIA—

Bengal Economic Journal. *Vol. 1, No. 1.* *April*, 1916—Bengal Economic Association.—Inaugural Meeting. The Effect of Poverty on the Public Health in India: *Bentley* (*Dr. C. A.*). The Economic Development of Japan: *Hamilton* (*C. J.*). Report of the Committee on Co-operation in India: *Collins* (*B. A.*). The Organization of Economic Research in Rural India: *Horne* (*E. A.*). The Economic Position of Education in India: *Gilchrist* (*R. N.*). The Moratorium: *Coyajee* (*J. C.*). Note on Two Forms of Index Numbers: *Williams* (*T. T.*). Commercial Museum at Calcutta: *Coyajee* (*J. C.*).

UNITED STATES—

American Economic Review. June, 1916—Tax Exemption through Tax Capitalization: *Adams* (*T. S.*). Valuation of Railroad Right-of-Way: *Sakolski* (*A. M.*). Trade Organization in China: *Muhse* (*Albert C.*). Wage Theories in Industrial Arbitration: *Compton* (*Wilson*). The Equation of Exchange for 1915: *Fisher* (*Irving*).

American Journal of Sociology. May, 1916—Fifty Years of Sociology in the United States (1865–1915): *Small* (*Albion W.*).

Annals of American Academy of Political and Social Science. May, 1916—Contains a series of articles by different authors on *Personnel* and Employment Problems grouped under the following heads:—Part 1. The Place of the Human Element in Industrial Management. Part 2. The Functionalized Employment Department. Part 3. Unnecessary Hiring and Firing of Employes. Part 4. The Securing, Selection and Assigning of Employes. Part 5. The Employe at Work.

Bankers' Magazine (*New York*)—

June, 1916—Other Reasons why State Banks do not join the Federal Reserve System. Financing the European War, 1914–16: *Bogart* (*Ernest L.*). Preparedness by Foreign Trade: *Requard* (*George*).

July, 1916—Railroad Control and Credit: *Sisson* (*Francis H.*). Sunken Treasure-Ships: *Mar* (*Alexander Del*). Nation-Wide Thrift Movement.

Journal of Political Economy—

May, 1916—The Stonecutters' Union and the Stone-Planer: *Barnett* (*George E.*). The Relation of the Literacy Test to a Constructive Immigration Problem: *Hoyt* (*Homer*). The Control of Interstate Utility Capitalization by State Commissions: *Heilman* (*Ralph E.*). Economic Interpretation of American History: *Dodd* (*William E.*).

June, 1916—German War Finance: *Going* (*M. Chase*). The Failure of Government Ownership in Canada: *Dunn* (*Samuel O.*). American Business and Finance after the War: *Willis* (*H. Parker*). An Appeal to "The Sober Reader": *Fetter* (*Frank A.*). Federal Reserve Check Clearings and Collections: *Gidney* (*Ray M.*).

Political Science Quarterly. June, 1916—Rome's Fall Reconsidered: *Simkhovitch* (*V. G.*). Capital and Monopoly: *Knauth* (*Oswald W.*). Return on Public Utility Investments: *Bauer* (*John*). Agreement in the Federal Convention: *Schuyler* (*R. L.*). Political Thought of Social Classes: *Ogburn* (*W. F.*) *and Peterson* (*Delvin*).

Quarterly Publications of American Statistical Association. No. 114. *June*, 1916—Some Problems of Population Growth: *Durand* (*E. Dana*). The Budgets of Smith College Girls: *Chapin* (*F. Stuart*). A Comparison of the Relative Healthfulness of certain Cities in the United States based upon the Study of their Vital Statistics: *Harmon* (*G. E.*). The Improvement of Statistics of Cause of Death through Supplementary Inquiries to Physicians: *Dublin* (*Louis I.*) *and Kopf* (*Edwin W.*). Statistical

UNITED STATES—*Contd.*

Quarterly Publications of American Statistical Association—Contd. Tabulation and Practice: *Falkner* (*Roland P.*). Statistical Standardization in Washington: *Parmelee* (*Julius H.*). Classification and Limitations of Statistical Graphics: *Goldenweiser* (*E. A.*). The Use of the Correspondence Method in Original Research: *Hobson* (*Asher*).

Yale Review. July, 1916—[After the war], Our Economic Peril: *Dewing* (*Arthur S.*). [After the war], British Imperial Federation: *Adams* (*George B.*). [After the war], The Industrial Future of Italy: *Zon* (*Raphael*). Americanizing the Immigrant: *Fairchild* (*Henry P.*). A Great French School in the War: *Lavarenne* (*Maurice*).

CUBA—

La Reforma Sociale—

May, 1916—La enseñanza agríeola en sus distintos grados: *Comallonga* (*José*). Organización de los partidos políticos: *Lopez* (*J. Ramos*). Comerico y produccíon de Azúcar de la Isla de Cuba, 1914–15.

June, 1916—Orígenes de la industria azucarera en Cuba: *Ortiz* (*F.*). De las deformidades legales; estudio médico-legal: *Barreras* (*A.*). La propedad agrícola y el crédito rural: *Putnam* (*G. E.*). La Tuberculosis después del Congreso de 1908: *Biggs* (*H. M.*). Ley de accidentes del trabajo de la República de Cuba. June 12, 1916.

EGYPT—

L'Égypte Contemporaine. No. 17. *May*, 1916—L'Italie economique avant et pendant la guerre européenne: *Cassuto* (*A.*). Observations sur le mode de calcul des années au point de vue de la Législation égyptienne: *Testoud* (*Ch.*). Le drainage des terres humides et salées du Delta égyptien: *Catzeflis* (*E.*). La question de la nationalité en Égypte et les différents problèmes qu'elle soulève: *Dahan* (*C.*).

FRANCE—

Bulletin de la Statistique Générale de la France. January, 1916—Cours des denrées à Paris (gros et détail). L'assistance aux familles nombreuses: premiers résultats de l'application de la loi du 14 Juillet, 1913: *March* (*Lucien*).

Bulletin de Statistique et de Législation Comparée—

April, 1916—Statistique des bouilleurs de cru. Les revenus de l'État. Allemagne: La banque d'Empire en 1914 et en 1915.

May, 1916—Relevé des opérations des bureaux de garantie en 1915. Le commerce de la France avec les pays étrangers (suite). Les revenus de l'État.

FRANCE—*Contd.*

Journal des Économistes—

June, 1916—Les Troisièmes douzièmes provisoires de 1916 et les projets d'impôts : *Guyot* (*Yves*). Les Finances de la Ville de Paris : *Schelle* (*G.*). Problèmes italiens d'après guerre : *Pantaleoni* (*Maffeo*). L'Impôt général sur le revenu : *Falck* (*Etienne*). Le Brevet d'invention international et la Conférence interparlementaire des alliés : *Jacq* (*Fernand*).

July, 1916—Le Privilége des bouilleurs de cru : *Guyot* (*Yves*). La Conférence économique. Ce que sera l'agriculture française au lendemain de la guerre : *Beckerich* (*Abel*). Jurisprudence financière et commerciale : *Tchernoff* (*I.*). Le Chéque postal : *Bellom* (*Maurice*). Phénomènes économiques italiens : *Pisani* (*Lorenzo*). Manifestations législatives espagnoles : *Meriel* (*Pierre de*). Le Tunnel sous la Manche et son influence économique : *Sabatier* (*J.*).

Journal de la Société de Statistique de Paris. June, 1916—Le commerce international en 1915 : *Guyot* (*Yves*). La population et les lois électorales en France, de 1789 à nos jours (suite) : *Meuriot* (*Paul*). Chronique des questions ouvrières et des assurances sur la vie : *Bellom* (*Maurice*). Variété : A propos de la population étrangère cultuelle de l'Italie : *Meuriot* (*Paul*).

La Réforme Sociale. June, 1916—Les raisons morales de la guerre italienne : *Vecchio* (*Giorgio del*). La vie sociale au front : *Buteau* (*Max*). Le statut des fonctionnaires et leur avancement : *Hubert-Valleroux* (*M.*). La culture des terres abandonnées : *Marcillac* (*M. le marquis de*). La Ligue nationale des économies. Le mouvement économique et social en France : *Lepelletier* (*F.*).

Revue des Nations Latines—

May, 1916—Les origines de la guerre—le plan Allemand : *Reinach* (*J.*). Après la guerre : la réadaptation morale : *Belot* (*G.*).

June, 1916—Le problème douanier franco-italien : *Landry* (*A.*). Le parti socialiste officiel italien et la guerre : *Ciccotti* (*E.*).

July, 1916—Les Banques italiennes : *Lévy* (*R. G.*).

ITALY—

Giornale degli Economisti e Rivista di Statistica—

May, 1916—I fenomeni economici della guerra : *Pantaleoni* (*Maffeo*). Le miniere di zolfo nella Sicilia e l'interesse economico-sociale di statizzare la proprieta : *Colajannie* (*Pompeo*). Sulla teoria delle curve di utilità : *Amoroso* (*Luigi*). I prezzi dei prodotti agricoli : *G. M.* Dati sul costo dell' alimentazione.

June, 1916—I fenomeni economici della guerra : *Pantaleoni* (*Maffeo*). L'integrazione industriale : *Crimi* (*G. N.*). L'istruzione professionale nell' economia nazionale italiana : *Bachi* (*Riccardo*). Ordinamenti da trasformare : *Campolattaro* (*Emilo di*).

ITALY—*Contd.*

La Riforma Sociale. May–June–July, 1916—I problemi economici della pace. Avvertenza introduttiva: *Einaudi* (*L.*). Sull' idea dell' Unione doganale tra gli Imperi centrali: *Michels* (*R.*). L'Italia industriale di ieri e di domani: *Prato* (*G.*). La guerra e la crisi del legname in Italia: *Serpieri* (*A.*), *Segala* (*G.*). L' Influenza dello stato di guerra sul costo di produzione dello zolfo in Sicilia e i provvedimenti del governo: *Colajanni* (*P.*). L' Imposta di ricchezza mobile e i nostri parliamentari. Di un' assicurazione di credito. A proposito di en provvedimento di guerra del Governo inglese: *Insolera* (*F.*). Di alcuni prestiti contratti dal Conte di Cavour: *Rota* (*R.*). Lo spostamento delle classi sociali in Italia nel decennio precedente le guerre: *Curato* (*G.*).

Rivista Italiana di Sociologia. March–April, 1916—I soggetti del diritto internazionale in tempo di guerra: *Miceli* (*V.*). La scienza dei popoli: *Corso* (*R.*).

INTERNATIONAL—

International Institute of Agriculture. International Review of Agricultural Economics—

May, 1916—Co-operative abattoirs in Demark. The Movement to organise credit in North Carolina: *Camp* (*W. M. R.*). Co-operative dairy societies in Great Britain. Popular co-operative credit institutions in Russia. Forest Insurance in Finland: *Wrede* (*Baron E. F.*). Provincial institutions for mortgage advances in Austria at December 1, 1913. The activity of German land settlement companies in 1914–15. Distribution of rural property and land settlement in Spain in their relation to the agrarian problem. The consolidation of farm-lands in France.

June, 1916—The National Bank of Italian rural credit societies and its first results. Popular co-operative credit in Russia. The Swiss Peasants' Union and the Swiss Peasants' Secretariate during 1915. The Italian National Maternity Fund. The Bank of Martinique. Business of Advances on Mortgage transacted by Swiss Cantonal banks and local banks. Closer settlement in New Zealand.

July, 1916—Danish dairies in 1914. Agricultural co-operation in Ireland. Popular co-operative credit in Russia. Rural Co-operative Societies in Servia. Insurance conditions in reference to the transport of cereals: *Rocca* (*Dr. G. L.*). Land Credit in French Indo-China. Agrarian and land credit in Italy during the five years, 1910–14. Land Settlement in Australia: *Jenkins* (*J. E.*). Distribution of rural property and closer settlement in Spain in relation to the agrarian problem. The working of the Small Holdings and Allotment Act, 1908.

BI-MONTHLY LIST OF ADDITIONS TO THE LIBRARY.

During the period that has elapsed since May 20, 1916, the Society has received the publications enumerated below.

Note.—Periodical publications are not included in this list, but they will be acknowledged at the end of the volume.

(a) Foreign Countries.

Denmark—

Copenhagen. Census. Folketællingen for København og Nabokommuner den 1. Februar 1916. 35 pp., 8vo. 1916. (Københavns Kommunalbestyrelse.)

Egypt—

Plague in Egypt during the year 1915. 17 pp., 4to. 1916. (Director-General of Public Health.)

France—

Infants. Allaitement Maternel au Magasin et à l'Atelier. Rapport de M. Abel Craussac au nom de la Commission Permanente. Procès-Verbaux, enquête et documents. xix + 24 pp., 8vo. 1916. (Ministère du Travail.)

Labour. Travaux des Commissions mixtes départementales pour le maintien du travail national. (Année 1915.) Procès-Verbaux des séances, rapports des sous-commissions vœux adoptés. Tome 1. Seine. x + 147 pp., 8vo. 1916. (*Id.*)

Revue des Nations Latines. 1ère Année. Nos. 1 and 2. 1916. 8vo. Paris, 1916. (The Publishers.)

Italy—

Milan. Housing. L'Istituto de Milano per le case popolari od economiche nel 1914–1915. 94 pp., 4to. 1916. (L'Istituto di Milano.)

Japan—

Census. État de la Population de l'Empire du Japon au 31 Décembre, 1913. (Tableaux.) 4to. 1916. (Bureau de la Statistique Generale.)

—— Exposé général des Résultats du Recensement de la Population de l'Empire du Japon à la fin de 1913. 179 pp., 4to. 1916. (*Id.*)

—— Graphiques Statistiques sur l'état de la Population de l'Empire du Japon. 4to. 1916. (*Id.*)

Kyoto Imperial University, College of Law. The Economic Journal. Vol. 11, No. 5. May, 1916. Malthus Commemoration Number. 8vo. Kyoto, 1916. (The College of Law.)

Norway—

Elections en 1915 pour le "Storting." viii + 197 pp., 8vo. 1916. (Bureau Central de Statistique.)

Live Stock. Bétail le 30 Septembre, 1914 et 1915. 47 pp., 8vo. 1916. (*Id.*)

Sweden—

Census, &c. Folkmangden inom administrativa omraden den 31 December, 1915. 42 pp., 8vo. 1916. (Bureau Central de Statistique.)

Switzerland—

Births, &c. Mariages, Naissances et Décès en Suisse de 1891 à 1900. 5e Partie. Les Causes de Décès. 395 pp. and maps, 4to. 1916. (Bureau Federal de Statistique.)

(a) **Foreign Countries**—*Contd.*

United States—

Bulletin of Labour. Bureau of Labour Statistics. Whole Numbers—

175. Summary of the Report on Condition of Women and Child wage earners in the United States. 445 pp., 8vo. 1916. (The Bureau.)

182. Unemployment among Women in Department and other retail stores of Boston. 72 pp., 8vo. 1916. (*Id.*)

184. Retail prices. 1907 to June 1915. 413 pp., 8vo. (*Id.*)

186. Labour Legislation of 1915. 494 pp., 8vo. (*Id.*)

191. Collective Bargaining in the Anthracite Coal Industry, March 1916. 171 pp., 8vo. 1916. (*Id.*)

New York State. Department of Labour Special Bulletin. No. 77. Industrial Accident Prevention. 54 pp., 8vo. 1916. (State Industrial Commission.)

Eugenics Record Office. Bulletin No. 15. The Dack Family. A Study in Hereditary Lack of Emotional Control. By Mrs. Anna Wendt Finlayson. With Preface by Charles B. Davenport. vi + 46 pp., 8vo. New York, 1916. (Eugenics Record Office.)

Insurance Institute of America. Proceedings of Seventh Conference. Held at Memphis, Tennessee, June 15, 16, and 17, 1915. 140 pp., 8vo. 1916. (The Institute.)

Johns Hopkins University. Studies in Historical and Political Science. Series xxxiii. No. 4. The Constitutional Doctrines of Justice Harlan. *Floyd B. Clark*, Ph.D. 206 pp., 8vo. Baltimore, 1915. (The University.)

—— Series xxxiv. No. 1. The Boycott in American Trade Unions. *Leo Wolman*, Ph.D. 148 pp., 8vo. Baltimore, 1916. (*Id.*)

Mechanics and Metals National Bank. War Loans and War Finance. An analysis of the war costs, war loans and government indebtedness of Europe, in their relation to the world at large. 47 pp., sm. 8vo. 1916. (The Bank.)

(b) **India and Colonies.**

India—

Trade, Return showing: (1) Value of Total Imports by Sea of Private Merchandise into British India. (2) Value of Total Exports by Sea of Indian Merchandise from British India for 1913, 1914 and 1915. 3 pp., fol. 1916. (Department of Statistics.)

Assam. Supplements to various Vols. of District Gazetteers. 6 vols., 8vo. 1914 and 1915. (The India Office.)

Bengal. Cuttack District Gazetteer Statistics, 1900–1901 to 1910–11, and Puri District Gazetteer Statistics, 1900–1901 to 1910–11. 2 vols., 8vo. 1915. (*Id.*)

Burma. Burma Gazetteer. Ruby Mines District, Vol. A, and Bassein District, Vol. A. 2 vols., 8vo. 1915–16. (*Id.*)

Madras. Madras District Gazetteers. Statistical Appendices for various Districts. 24 vols., 8vo. 1915. (*Id.*)

Madras. Balasore District Gazetteer Statistics. 1900–1901 to 1910–11. 1 vol., 8vo. 1915. (*Id.*)

North-West Provinces. Santal Parganas District Gazetteer, B Vol. Statistics, 1900–1901 to 1910–11, and Purnea District Gazetteer, B Vol. Statistics, 1900–1901 to 1910–11. 2 vols., 8vo. 1915. (*Id.*)

United Provinces of Agra and Oudh. Supplementary notes and Statistics to various Vols. of District Gazetteers of United Provinces of Agra and Oudh. 5 vols., 8vo. 1916. (*Id.*)

Bengal. Bengal Economic Journal, April, 1916. Vol. 1. No. 1. 138 pp., 8vo. 1916. (Macmillan and Co.)

(c) **United Kingdom and its several Divisions.**

United Kingdom—

Financial Statement (1916–1917). Rates of Income Tax and Super Tax. (51.) 3 pp. 1916. (Purchased.)

(c) United Kingdom and its several Divisions—*Contd.*

United Kingdom—*Contd.*

Fishery Investigations. Series 11. Sea Fisheries. Vol. iii. No. 3. An Analysis and Review of the English Plaice Marking Experiments in the North Sea. 126 pp., fol., with maps, &c. London, 1916. (Board of Agriculture and Fisheries.)

Munitions. Notes on Employment of Women on Munitions of War, with an appendix on Training of Munition Workers. 4to., 94 pp. London, 1916. (Purchased.)

—— Report on Output of Munitions in France. December, 1915. [Cd-8187.] 10 pp., fol. (*Id.*)

Superannuation. Report of Departmental Committee on Superannuation of Officers of Reformatory and Industrial Schools. 19 pp., fol. 1916. (*Id.*)

Scotland—

Second Report of Highlands and Islands Medical Service Board for year ended 31st Dec., 1915. [Cd-8246.] 58 pp., 8vo. 1916. (*Id.*)

(d) Authors, &c.

Babson (*Roger W.*). The Future of South America. 407 pp., 8vo. Boston, 1915. (Babson's Statistical Organization.)

Beck (*The Hon. James M.*). America and the Allies. Address. 23 pp., 8vo. London, 1916. (Committee of the Pilgrims Club.)

Benn (*Ernest J. P.*). Trade as a Science. With an introduction by the Right Hon. Lord Burnham, M.A. 184 pp., 8vo. London, 1916. (Jarrold and Sons.)

Brown (*Harry G.*)—

Foreign Exchange. A Study of the Exchange Mechanism of Commerce. x + 159 pp., 8vo. New York, 1915. (Macmillan and Co.)

Transportation Rates and their Regulation. A Study of the Transportation Costs of Commerce with especial Reference to American Railroads. xii + 347 pp., 8vo. New York, 1916. (*Id.*)

Clark (*John J.*). Outlines of English Local Government. 40 pp., sm. 8vo. Manchester, 1916. (Liverpool Booksellers Co.)

Dewey (*John*). Democracy and Education. An Introduction to the Philosophy of Education. xii + 434 pp., 8vo. New York, 1916. (Macmillan and Co.)

Einaudi (*Luigi*)—

Corso di Scienza della Finanza. 3rd Edition. xvi + 594 pp., 8vo. Torino, 1916. (The Author.)

Di un Teorema intorno allà Nazionalizzazione della Produzione. Nota del Socio. 23 pp., 8vo. Torino, 1916. (*Id.*)

Germanofili ed Anglofili. 7 pp., 8vo. 1916. (*Id.*)

Farrow (*Thomas*) and *Crotch* (*W. Walter*). The Coming Trade War. 164 pp., 8vo. London, 1916. (Chapman and Hall.)

Gehle (*F. W.*). Financial Legacy and Economic Aspects of the Greatest War in History. Cost of two years of hostility and problems of rehabilitation. Sheet fol. New York City, 1916. (The Mechanics and Metals National Bank.)

Gumbel (*E. J.*). Die Berechnung des Bevölkerungsstandes durch Interpolation. 88 pp., 8vo. Leipzig, 1916. (Stanpfli and Cie.)

Hauser (*Henri*). Les Methodes Allemandes d'Expansion Economique. 3e Edition revue et corrigée. vi + 290 pp., 8vo. Paris, 1916. (Librairie Armand Colin.)

Hewitt (*E. G.*)—

Activities and Wealth of the United States. 4 pp., sheet. January, 1916. (Edwin W. Greenbour.)

Distribution of Wealth in United States, 1910. 4 pp., sheet. November, 1914. (*Id.*)

Hoffman (*Frederick L.*). The Mortality from Cancer throughout the World. xv + 826 pp., 8vo. Newark, 1915. (The Prudential Press.)

(d) Authors, &c.—*Contd.*

Jackman (*W. T.*). The Development of Transportation in Modern England. 820 pp., in 2 vols, 8vo. Cambridge, 1916. (The Cambridge University Press.)

Lambert (*Henri*). International Morality and Exchange. With an introduction by the Rt. Hon. Lord Courtney of Penwith. 40 pp., 8vo. London, 1916. (Allen and Unwin.)

Melrose (*C. J.*). The Data of Economics. Expressly designed for the general reader. xv + 388 pp., 8vo. London, 1916. (The Mitre Press.)

Melzi (*B.*). Nuovo Dizionario Inglese-Italiano e Italiano-Inglese. 579 pp., 8vo. Milano, 1915. (Purchased.)

Murray (*J. Alan*). The Economy of Food. A Popular Treatise on Nutrition, Food and Diet. Popular edition. xii + 253 pp., 8vo. 1916. (Constable and Co.)

Pratt (*Edwin A.*). A London Transport Trust. Criticism of an impracticable scheme. Central Goods Clearing House. 70 pp., 8vo. London, 1916. (The Author.)

Richardson (*Alex.*). The Man-Power of the Nation. Suggestions as to Industrial Efficiency for Employers and Workers. 111 pp., sm. 8vo. London, 1916. (The Publishers of "Engineering.")

Robertson (*Rt. Hon. J. M.*). Shipping after the War. 39 pp., 8vo. London, 1916. (Cobden Club.)

Savorgnan (*Franco*)—

Intorno all'approssimazione di alcuni indici della distribuzione dei redditi. pp. 837 to 893 and Appendice, 8vo. Venezia, 1915. (The Author.)

Sulla formazione del valori dell' indice di cograduazione. Nota Metodologica. 37 pp., 8vo. Cagliari, 1916. (*Id.*)

Schlich (*Sir W.*), F.R.S. Forestry in the United Kingdom. (The case restated.) Reprint from "The Journal of Forestry," July, 1916. 21 pp., 8vo. London, 1916. (*Id.*)

Smart (*William*). Second Thoughts of an Economist. lxxix + 189 pp., 8vo. London, 1916. (Macmillan and Co.)

Webb (*Sidney*). (Editor.) How to pay for the War: Being ideas offered to the Chancellor of the Exchequer by the Fabian Research Department. Edited by Sidney Webb. xiii + 278 pp., 8vo. London, 1916. (The Fabian Society.)

Weld (*L. D. H.*). The Marketing of Farm Products. xiv + 483 pp., 8vo. New York, 1916. (Macmillan and Co.)

White (*James Dundas*), M.P., &c. A Scheme for Land-Value Taxation. 16 pp., sm. 8vo. London, 1916. (P. S. King and Son.)

(e) Societies, &c. (British), and Miscellaneous.

Council for the Study of International Relations. Belgium and the Principle of Nationality, by Jules Destree. Foreign Series. No. 5. 45 pp., 8vo. 1916. (The Council.)

Dalgety's Annual Wool Review for Australasia. Seventeenth Year of Publication. 1914–15. 2 copies. iv + 90 pp., 4to. (Dalgety, Ltd.)

The Declining Birth-rate, its causes and effects (being the Report of and the chief evidence taken by the National Birth-Rate Commission, instituted, with Official recognition, by the National Council of Public Morals—for the Promotion of Race Regeneration—Spiritual, Moral and Physical). xiv + 450 pp., 8vo. London, 1916. (Chapman and Hall.)

ANNUAL LIST OF ADDITIONS TO THE LIBRARY.

Since July 7, 1915, the Society has received the periodical publications enumerated below. They are arranged alphabetically by subjects (works of a general nature coming first) under the following heads:—(a) Foreign Countries; (b) India and Colonial Possessions; (c) United Kingdom and its Divisions; (d) Societies, &c. (British); (e) Periodicals, &c. (British).

(a) Foreign Countries.

Argentine Republic—
Anuario de la Direccion General de Estadistica. Año 1911, Tomo 2; Año 1912, Tomos 1–3; Año 1913. Trade Returns (quarterly) for 1915.

Brazil—
Trade Returns for 1914–15.

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NOTICE.

The Council have again decided to omit from the July *Journal* the usual Appendix containing the List of Fellows, Bye-Laws and Rules of the Society and the List of Donors to the Library.

For the information of Fellows and others concerned, a list is appended of the names and addresses of Fellows elected since July last year :—

List of Fellows elected since July, 1915.

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Nigeria House, 1–4, *Giltspur Street, E.C.*
Falk, Oswald Toynbee,
1, *St. John's Wood Park, N.W.*
Fitzpatrick, Thomas,
36, *Loraine Road, Holloway, N.*
Goodman, Arthur Frank,
Nels Rust, Natal, South Africa.
Hartwell, Alfred,
50, *Finsbury Square, E.C.*
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Buluwayo, South Africa.
Keating, Matthew, M.P.,
House of Commons, S.W.
Lewis, Alfred E.,
Fir Royd, Myddelton, Ilkley.
Loveday, Alexander,
St. Peter's College, Cambridge.
Lupton, L. E.,
G.P.O., Accra, Gold Coast.
Madsen, Arthur Wilhelm, B.Sc. (Edin.),
7, *Balmuir Gardens, Putney, S.W.*
Melglave, Maurice,
117, *Highbury New Park, N.*
Orensteen, Myer M.,
Census Office, State Statistical Department, Cairo, Egypt.
Penton, Edward,
2, *Cambridge Terrace, Regents Park, N.W.*
Read, John Armstrong,
Caixa do Correio 571, *Rio de Janeiro, Brazil.*

List of Fellows elected since July, 1915—*Contd.*

Saltmarsh, Sir George,
Sandridge, near St. Albans.
Snell, Roy Albion,
15, *Chatsworth Road, Brondesbury, N.W.*
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Ellerslie, Abercrombie Road, Fleetwood.
Wilson, G. B.,
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